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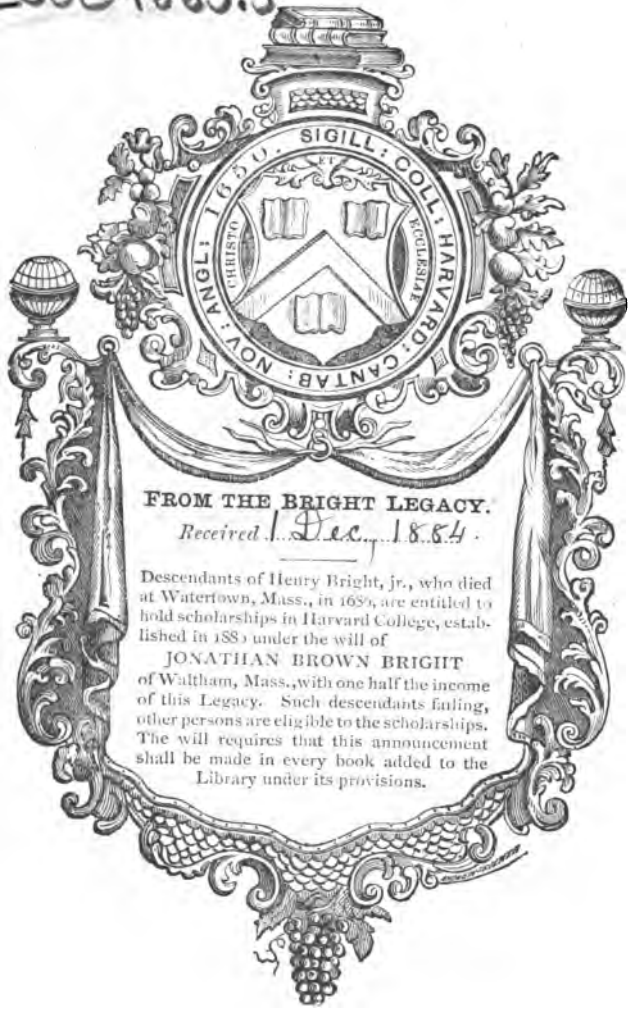

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CONTENTS.

Officers of the Albany Institute, 1883, - - - v

The Utica Slate and Related Formations of the Same Geological Horizon, by C. D. Walcott, - - - - 1

Fossils of the Utica Slate, by C. D. Walcott, - - 18

Degraded Words, by Gilbert M. Tucker, - - - 39

Descriptions of New Species of Fossils from the Niagara Formation, by James Hall, LL. D., - - - 57

The Origin of Force, by Stephen C. Hutchins, - - 77

Industrial and Material Progress, Illustrated in the History of Albany (Annual Address), by David Murray, LL. D., 85

Whittington and His Cat, by Ernest J. Miller, - 105

An Account of the Manuscripts of Gen. Dearborn, as Massachusetts Commissioner in 1838 and 1839, for the Sale of the Seneca Indian Lands, by Henry A. Homes, LL. D., - 128

Proposed Erection of Local Historical Monuments; Report of Special Committee on Archæology, - - 137

Bryozoans of the Upper Helderberg and Hamilton Groups, by James Hall, LL. D., - - - - 145

The First Men: Their Epoch, Habitat and Crania, by Stephen C. Hutchins, - - - - - - 198

The Principles of Ventilation, by Richard Prescott, M. E., 217

The Physical Sciences the Products and Promoters of Civilization (Annual Address), by Paul A. Chadbourne, LL. D., 227

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Prehistoric Music, by Armand de Potter, - - - 241

The Correct Arms of the State of New York, by Henry A. Homes, LL. D., - - - - - - 245

The Plea of Insanity, by Horace E. Smith, LL. D., - 290

Linguistic Discussions, by George R. Howell, - - 306

Gravestones Æsthetically and Ethically Considered, by Irving Browne, - - - - - - - 320

American English, by Gilbert M. Tucker, - - - 334

Catalogue of Members of the Albany Institute, - 361

Index, - - - - - - - - 366

Plates, in order as below;

Fossils of the Utica Slate (two plates).

Arms of the State — Initial from Commission issued by Governor Clinton, 1778.

Arms of the State — Regimental Flag, 1778.

Arms of the State — Painting in St. Paul's Chapel, New York, 1785.

Arms of the State — As restored for the action of the Legislature.

Arms of the State — Official Representation, as re-established by law taking effect Jan. 1, 1883.

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TRANSACTIONS.

THE UTICA SLATE AND RELATED FORMATIONS OF THE SAME GEOLOGICAL HORIZON.

By C. D. Walcott.

[Read before the Albany Institute, March 18, 1879.]

The Utica Slate.

Mohawk slate, Black slate and shale, Frankfort slate, Graptolitic slate, Lorraine shales (in part) of the New York Geological Reports.

In part Professor Eaton's *Transition argillite, Wacke slate* and *Glazed slate. No.* 3 and the *Matinal Black slate* of the Pennsylvania Survey.

The name Utica slate was adopted by the New York geologists in their final reports for the black bituminous slates succeeding the Trenton limestone in the Mohawk and Black River valleys — Prof. E. Emmons retaining the term Lorraine shales for the upper portion beneath the shaly sandstones of the Hudson River group, or Lorraine sandstones as he termed them. The term Hudson River group, with the Utica slate for a subdivision embracing the lower slaty portion, was, however, generally received into geological nomenclature.

At the typical locality in the vicinity of Utica the formation has a thickness of over 600 feet, the upper part passing into the lighter colored, more silicious slate, beneath the Oneida conglomerate; this change of color and addition of silicious material, with the presence of a few thin sandy layers, alone representing the arenaceous shales and sandstones of the Hudson River group in its extension east and west from this point. The Utica slate would otherwise be a continuous formation from the Trenton limestone to the base of the conglomerate.

At Rome, fifteen miles west, the shaly sandstones increase in

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thickness, and contain characteristic fossils of the Hudson River formation above the Utica slate, namely: *Ambonychia radiata*, *Modiolopsis modiolaris*, *Cyrtolites ornatus*, etc. The extensive development of this portion of the group in the valleys of the Black, Salmon and Hudson rivers, and its almost entire absence near Utica, is undoubtedly owing to some local cause which affected the distribution of the coarser sediments.

The Utica slate formation was traced by the New York geologists down the Mohawk valley from Oneida county through Herkimer, Montgomery, Schenectady and Saratoga counties to the shores of the Hudson. At Baker's Falls, Saratoga county, it is seen in contact with, and resting upon, the Trenton limestone. It here contains graptolites characteristic of the formation in Central New York and also the typical fossil of this horizon, *Triarthrus Becki*. Trilobitic remains are very rare in localities where graptolites abound in the undisturbed slates in Oneida county. This is particularly noticeable in the graptolitic slates of the Hudson River valley, where the graptolitic fauna flourished to the almost entire exclusion of other forms common to the slates elsewhere.

Prof. Wm. W. Mather[1] gives the following localities in the Hudson river valley below Baker's Falls, where the Utica slate is to be observed with its characteristic graptolites: at Waterford, Cohoes, Norman's kill below Albany, at Hudson, and also one and one-half miles below on the same side of the river; in the black slate of the Shawangunk mountain, one and one-half miles east of Ellenville, Orange county; also at Blue Rock in Marlborough on the bank of the Hudson several miles below Poughkeepsie.[2] Owing to the disturbed condition of the strata the graptolites afford the means of determining the geological horizon, where, without their being present, it would be exceedingly difficult if not impossible to do so.

Prof. R. P. Whitfield, in a letter[3] written to Dr. C. A. White, gives a very full description of the occurrence of the graptolites at Norman's kill and the evidence they afforded of the equivalency of the graptolitic slates and the Utica slate.

Prof. Mather included a greater range of rocks in the Hudson River group, on the east side of the Hudson, than is now recognized as belonging to it. The evidence, however, that he adduced in 1843

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[1] *Geol. of N. Y. Surv. First Geolog. Dist.*, pp. 393–395. 1843.

[2] It is interesting to note in this connection that Mr. T. Nelson Dale, Jr., has recently discovered typical Hudson River group fossils in this same vicinity. *Amer. Journ. Sci. Arts*, XVII, p. 57. 1879.

[3] *Wheeler Expd. West of the 100th Meridian*, IV, Pt. I, Pal., p. 19. 1875.

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of its presence, with its lower division the Utica slate, in the valley of the Hudson, was very complete, and, judging from the writings of his associates on the geological survey and contemporary writers, accepted as conclusive. Of the controversy which arose at the time of the *making* up of the Quebec group, regarding the age of these rocks along the Hudson and the retaining of the term Hudson River group in geological nomenclature, a very complete review will be found in a paper recently published by Prof. James Hall.[1]

Passing to the south-west along the line of the Appalachians, we find the Utica slate mentioned by Prof. H. D. Rogers, as occurring in the long valleys crossing the southern, central half of the state of Pennsylvania and into Virginia. In the Kittatinny and Kishicoquillas valleys it has a thickness of from 300 to 400 feet and carries graptolites, also *Triarthrus Becki.*

South-westward in Virginia the black slate passes into the drab colored shales of the Nashville group of Tennessee, reference to which will be made in reviewing the formations of the Utica slate horizon. The northern extension of the formation from Baker's Falls, Saratoga county, is seen in the numerous outcrops in the Champlain valley and down to the St. Lawrence river, where it expands and extends from Montreal to below Quebec. An outlier at Lake St. John, and the presence of the slate in the channel between the Mingan Islands and the Islands of Anticosti, gives the known extension to the north and north-east.[2] Of its presence at Anticosti Sir William Logan says :[3]

"Loose fragments of black, strongly bituminous graptolitic shales, in every way resembling those of the Utica formation, and of some of the interstratified beds of the Hudson River, are met with on the beach on the north side of Anticosti."

Graptolites abound at Lake St. John and *Triarthrus Becki* also occurs. West of Montreal numerous outliers of the Utica slate are found in the Ottawa basin. *Asaphus Canadensis,* which occurs so abundantly at Collingwood on Georgian Bay, is found near the city of Ottawa associated with *Triarthrus Becki* and other characteristic fossils of the Utica slate formation.

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[1] *Proceed. Amer. Assoc. Adv. Sci.* 1877.

[2] Professor C. H. Hitchcock, in the *Science News* of March 15, 1879, states that Professor B. K. Emerson of Amherst College, has in his possession specimens of *Triarthrus Becki Climacograptus bicornis,* etc., from the Arctic regionsbr ought by Captain Hall; thus proving the presence of the Utica slate horizon to the north of any previous known exposure.

[3] *Geology of Canada,* p. 221. 1863.

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Having traced the extension of the formation down the Mohawk valley to the Hudson and thence north, north-east, and south-west, we return to Utica and follow it to the north-west across Oneida, Lewis and Jefferson counties to the eastern shore of Lake Ontario. It outcrops on the shore east of Toronto, on the north side of the excavation made in the strata by the lake basin, and, crossing the province of Ontario in a north-westerly direction, presents a fine exposure at Collingwood on Georgian Bay. With a more westerly trend it is next seen crossing the northern side of Manatoulin Island in Lake Huron, beyond which, in its characteristic black bituminous shaly formation, it has not been traced.

On Manatoulin Island the thickness has decreased to fifty feet (Logan).

Dr. C. A. White[1] mentions the discovery in black slates in Nevada of *Graptolithus quadrimucronatus*, *G. pristis*, and two species allied to forms found in the Utica slate. This discovery will have an important bearing on the extension of the Utica epoch to the western side of the continent, should it be substantiated by subsequent investigation.

The Trenton limestone and the strata of the Hudson River formation are co-extensive with the geographical range given for the Utica slate. In many instances it is difficult to indicate the line of demarcation between the latter formation and the strata above or below, while in other localities the limits of each formation are clearly defined. In Jefferson county, N. Y., it is only by an arbitrary line that the Utica slate can be separated from the Hudson River formation.[2] In the town of Deerfield, Oneida county, N. Y., the Trenton and Utica formations are as intimately connected, lithologically, as the Utica formation is with the succeeding Hudson River formation, which is also the case to the north-east on the St. Lawrence[3] and in other localities.

Prof. H. D. Rogers in the Pennsylvania Survey Report, 1858, says:

"The transition from the formation of this very fossiliferous limestone (Trenton) to that of the bluish black, carbonaceous, matinal (Utica) shale, was, throughout most of the basin, now accessible to study, somewhat abrupt; though, as we have seen, it was extremely gradual in one part of their south-east outcrop, or in the northern section of the great valley of Virginia. There, there is such an intermingling of the materials, and even of the fossils of the two strata, that a division of the blended mass is difficult if not impossible.

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[1] *Wheeler's Expd. West of the 100th Meridian*, IV, Pt. I, Pal., p. 10. 1875.

[2] *Emmons's Agriculture of New York*, I, p. 123. 1846.

[3] *Geology of Canada*, p, 202. 1863.

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But, through Pennsylvania and all the country north and north-west of it, whenever both formations appear, their line of separation is a somewhat crisp one. It is evident from this that over most of the watery floor there occurred almost simultaneously some great physical change banishing the conditions favorable for the deposition or secretion of carbonate of lime and permitting the introduction and tranquil precipitation of dark, carbonaceous sandy clay or fine, gritty blue marl."

These varying conditions of the formation along the line of contact with the inferior and superior strata have led to considering the Utica slate as an independent formation and, at the same time, as beds of passage between the Trenton and Hudson River formations. Prof. J. D. Dana[1] unites all the rocks between the Chazy limestone and the Medina sandstone epochs under the term Trenton period, with the divisions of the Trenton, the Utica, and the Cincinnati epochs.

Equivalents of the Utica Slate.

Prof. Dana includes the Utica slate alone in the Utica epoch. The writer would also include strata which are apparently equivalent in time as well as stratigraphical position in the geological series.

The extensive geographical distribution of the Utica slate, its retaining its characteristic black carbonaceous shaly character, a peculiar association, and comparatively large development of organic forms, and an average large volume unite to indicate a prolonged continuation of conditions favorable to the depositions of the sediments forming it. During the period this formation was being deposited in the eastern and northern portions of the Appalachian basin,[2] the central, western and north-western areas must have been receiving a deposit of a character in accordance with the conditions prevailing without the limits of the deposition of the sediments forming the Utica slate.

When investigating this subject, and after the outline of this paper was sketched, the writer read a passage in the description of the matinal series of Pennsylvania which indicates that Prof. H. D. Rogers had considered the question in the same light many years before, since which time it appears to have been overlooked. He says:[3]

"The lead-bearing limestone of Wisconsin and Illinois, superior

[1] *Manual of Geology.* 1874.

[2] Appalachian basin is used in this paper as including the interior continental basin as was originally defined by Prof. Rogers.

[3] *Geol. of Penn.*, II, p. 784. 1856.

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in position to the matinal (Trenton) limestone and inferior to the matinal (Hudson River) shales is evidently nearly upon the horizon of the matinal (Utica) black slate."

The facts to be presented will add materially to the view advanced by Prof. Rogers and, it is believed, will warrant our including the Galena limestone in the Utica epoch.

The Galena limestone has been very fully described in the publications and reports of Professors Whitney, Hall, Chamberlain, Winchell and other authors who have written on the geology of the region over which it is developed and exposed to examination. It is evident that the formation is more closely related to the Trenton limestone than to the Hudson River formation; and this must necessarily follow from its being a limestone formation succeeding a limestone and thus enabling the more persistent forms of the Trenton fauna to live on in the seas under conditions that varied comparatively little, if we contrast the change that took place, from the Trenton limestone-forming seas to the turbid waters that deposited the Utica slate. That there is such a marked change in the fauna of the Galena is one of the strongest proofs of the great extent of the physical change which accompanied the introduction of the Utica epoch.

The most north-easterly exposure of the Galena limestone is mentioned by Prof. James Hall as occurring on the Escanaba river in the upper peninsula of Michigan. He says :[1]

"The upper layers of gray limestone having a thickness of fifteen feet which rest on the Trenton limestone do not appear to be identical with any portion of the Trenton limestone farther east."

He then shows that these beds are the probable north-eastern extension of the Galena limestone.

"That the lead-bearing rock is a peculiar one, holding a certain place in the series and of limited geographical extent. * * * * * * The fact of the existence of this rock, as a distinct member of the series, is interesting in a geological point of view and opens the question as to the completeness of the series which have been studied in New York, Canada, Pennsylvania and Virginia."

In describing the formation in Wisconsin the same author says :[2]

"In some localities there is an abrupt passage from the blue limestone or Trenton limestone below, but not unfrequently some thin argillaceous and calcareo-magnesian layers constitute beds of passage from the lower rock. The middle portion is heavy bedded, very crystalline, and free from any considerable proportion of argil-

[1] *Foster and Whitney's Report of the Lake Superior Land District*, Pt. 2, pp. 146, 148. 1851.

[2] *Geology of Wisconsin*, I, pp. 43, 44. 1862.

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laceous matter. The upper portions are usually thinner bedded and more argillaceous, *and often pass by a gradual accession of argillaceous material into the shaly rocks of the group above.* * * * * * * In some localities there are repetitions of the lower calcareous strata above the base of the Galena limestone or alternations of thin fossiliferous beds of the Trenton limestone with the dolomitic limestone of the Galena period."

In the second volume of the *Geology of Wisconsin*, Prof. T. C. Chamberlain gives a detailed description of the Galena formation and a list of the species of fossils occurring in it. From this we learn that towards the north-western portion of the state the formation begins to undergo a change.

"The modification consists mainly in the introduction of more clayey material in the form of shaly leaves and partings. This changes the color from the usual buff to a greenish or bluish-gray. There is also an increase of fossils. * * * * * * * * * The change in the Galena limestone is gradual and progressive for forty or fifty miles, beyond which its nature as modified, becomes constant for nearly one hundred miles, to the limits of the state."

The formation has still more the character of beds of passage between the Trenton and Hudson River formations in its north-western extension. The following extracts are taken from Prof. N. H. Winchell's report,[1] as giving information of the Galena limestone, and also an account of reference being made to the nomenclature of the period to which it belongs:

"In New York the Trenton limestone is succeeded by a mass of shales with the local designations, Utica slate, Frankfort slate, shales and sandstones of Pulaski, and Lorraine shales. These were all embraced in the term Hudson River group, which had before been applied to a mass of shales that are now known to be much lower. On account of this error the term Cincinnati group has been generally substituted."[2]

"On the other hand in Iowa and southern Wisconsin and Minnesota, the Trenton limestone is found to pass into the Galena by slow stages and to be followed, at least in Iowa, by a greatly reduced representative of the Cincinnati group, named by Dr. White the Maquoketa shales. Leaving Iowa and passing into Minnesota the Trenton increases in thickness, and the Galena diminishes, the latter

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[1] *Sixth Ann. Rep. Geol. and Nat. Hist. Survey of Minnesota*, pp. 82, 83. 1878.

[2] The erroneous reference of the shales of the Hudson River group in the valley of the Hudson to a lower geological horizon is one that, since the correction of the error by Prof. James Hall and more recently by Prof. J. S. Newberry, will undoubtedly be dropped as an argument in favor of retaining the term Cincinnati group. The only grounds upon which it can be retained with any degree of reason are those advanced by Prof. Newberry in the *Geology of Ohio.*

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becoming interstratified with beds of shale. In Olmstead county, still further north, the Trenton also contains numerous beds of shale; and the Galena is still further reduced. The beds are traceable by continuous or frequent out-crops throughout Goodhue and Rice counties, with an increasing amount of contained shale in the Trenton, and finally with the *complete loss* of the Galena."

The Galena formation, attaining its maximum development in the area bordering on northern Illinois, south-western Wisconsin and eastern Iowa diminishes in volume to the north, north-east and north-west. In the area mentioned it has a thickness of from 200 to 275 feet; it is not to be found near the primary rocks on the old shore line of the northern border of the basin, having thinned out in that direction. To the south it passes beneath the superior formations, with the exception of an area in Missouri, where, although having considerable volume, it is less than in its central area. In south-western Illinois the Thebes sandstone rests directly upon the Trenton limestone, occupying the same position as the Galena limestone does in Illinois and Missouri.

Having reviewed the Utica epoch in its stratigraphical character and geographical distribution, over its eastern, northern and western extension of the Appalachian basin, there remains the great central area over which, from its being remote from the eastern and northern shore lines, the sediments were deposited with less abrupt changes in their character and with less disturbance of the then living fauna.

In 1842 Prof. James Hall said of the lower beds exposed near Cincinnati:

"At Newport, Kentucky, opposite to Cincinnati and at one or two other places in the vicinity, there is a green shale with the Triarthrus, graptolites and a few encrinal joints, showing the same assemblage of fossils and in the same position as the Utica slate of New York."

The rock below these beds he considered the equivalent of the Trenton limestone and above the equivalent of the sandstones of Salmon river and the shales and sandstones of Pulaski.[1] Thirty-seven years of study and investigation of this formation has not changed the value or correctness of this statement, as is well shown by the recent action of the committee on Geological Nomenclature, of the Cincinnati Society of Natural History.[2]

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[1] *Notes on the Geology of the Western States. Amer. Journ. Sci. Arts*, p. 61. 1842.

[2] "The fossils found in the strata, for twenty feet or more above low water mark of the Ohio river, in the first ward of the city of Cincinnati, and on Crawfish creek, in the eastern part of the city, and in Taylor's creek east of Newport, Kentucky, at an elevation of more than fifty feet above low water mark in the

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Prof. Edward Orton on page 369 of the first volume of the *Geology of Ohio* 1873, says :

"It will, however, be shown to be probable that the lowermost beds of Cincinnati are the proper equivalent of the Utica slate ; in other words, that these shales and limestones were growing here, while the black Utica shales were in progress of deposition in Eastern New York."

Also on page 398, in referring to the presence of *Triarthrus Becki*, he says :

"Some interest is connected with the occurrence of this fossil here, because it is counted quite a characteristic fossil of the Utica shale, of Eastern New York. It belongs, however, in the Trenton of the same region, so that no parallelism of formations is effected by this trilobite, which other fossils are unable to establish. The most that can be said in regard to it, is, that it suggests the low water beds of Cincinnati as the equivalent of the Utica shale."

The specimens of *Triarthrus Becki* found in the Trenton limestone of New York occur in the upper portion of the formation in what may

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Ohio river, indicate the age of the Utica slate group of New York. A fauna is represented in these rocks, that is not found above or below them. Within this range, we find the *Triarthrus Becki, Leperditia Byrnesi, Leptobolus lepis, Buthotrephis ramulosa,* and several species of graptolites, crinoids, bryozoans, and brachiopods, that seem to be confined within its limits. Moreover, the brown slates and greenish blue shales and concretionary nodules give a lithological character to the strata, which distinguish them from the strata both above and below. From the evidence thus furnished by the lithological character of the strata, and the distinct character of the fossil remains, we refer all the strata containing the *Triarthrus Becki* to the age of the Utica slate group of New York.

"Above the range of the *Triarthrus Becki*, the fossils, as well as the position of the rocks, indicate the age of the Hudson River group of New York, and we have no hesitation in so referring them, and entertain no doubt of the correctness of the reference.

"The fossils from Paris, Lexington, the High Bridge over the Kentucky river, and from other places in Kentucky, as well as the lithological character of the strata, furnish abundant evidence of the existence of the Trenton group over an extensive tract of country, in that state. In the state of Kentucky, we have the Trenton, Utica slate and Hudson River groups well represented, and the rocks have a northerly dip from Paris and Lexington, toward the Ohio river. * * *

"The conclusion is, that all the Lower Silurian rocks, which we have under consideration, are to be referred to the Trenton, Utica slate and Hudson River groups, and that the name 'Cincinnati group' should be dropped, not only because it is a synonym, but because its retention can subserve no useful purpose in the science, and because it will, in the future, as in the past, lead to erroneous views and fruitless discussion. And we would add that so far as any investigations of these rocks have been made, they have not led to any further or other subdivisions than those which we have adopted, and which have been so thoroughly and firmly established by the geologists of the state of New York.[1]"

[1] Report of special meeting of the Cin. Soc. Nat. Histy., Jany. 23d, 1879.

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be termed beds of passage to the Utica slate, and have not, to the writer's knowledge, been found lower in the formation. During eight years of work in the Trenton limestone I have never seen a fragment of this trilobite below the upper shaly passage beds. It has a distinct geological horizon, and its presence indicates a parallelism of formations as will be shown by the facts presented in this paper. The presence of the Utica slate horizon does not rest solely on the presence of this trilobite as there is both a palæontological and lithological break in the series, at this horizon, throughout the Appalachian basin with the exception it may be at the extreme north-western and south-eastern outcrops.

In South-western Illinois, the formation resting on the Trenton limestone is described by Professor A. H. Worthern (*Geol. of Ill.*, III, p. 27, 1868), as a sandstone, which he calls the "Thebes sandstone and shale." He says:

"This formation, which underlies the limestone above described (dark blue compact limestone) is well exposed in the vicinity of Thebes. * * * * * The lower portion of it only is a true sandstone, and is about thirty feet in thickness, and passes upward into a sandy shale of a dark brown color. * * * * * A half mile below Thebes we found a yellowish brown shale, apparently not above five or six feet in thickness, that evidently formed the base of this group. It was filled with fragments of *Trilobites*, apparently belonging to the *Asaphus canalis*, which, with a *Lingula* found in the upper shale immediately below the limestone, are the only fossils it has afforded. * * * * * Some of the sandstone layers are from two to three feet in thickness and well adapted for building purposes."

In the valleys of Virginia, Eastern Tennessee, and Northern Alabama, the black carbonaceous shales of the Utica slate are replaced by the lighter colored marls and shales of the same geological horizon.

Professor James Safford in the *Geology of Tennessee*, pp. 228—273, 1869, describes the Trenton and the Nashville rocks in East Tennessee as follows:

"They are, first, a stratum of blue limestone, more or less argillaceous, from 200 to 600 feet thick, then, above this, a great body of sky-blue calcareous and often sandy shales. * * * * In going to the north-west the shales become more and more calcareous approaching the condition of the same strata present in Middle Tennessee.

"At the base of the sky-blue calcareous shales in the eastern border counties there is a fine dark or black shale, becoming in places 100 or 150 feet thick. It abounds, very generally, in graptolites. The graptolites are not confined to this lower stratum, they run up into the main body of the shale and are found at numerous localities.

"In the basin of Central Tennessee the rocks are mainly blue limestones throughout. The entire series is about 1000 feet thick

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and is equally divided between the Trenton and Nashville series. This series is a *natural group*, and though each member has many of its own, yet there are a number of forms uniting the two. It is divided both on lithological and palæontological grounds into two sub-groups. The Trenton ends with a light colored, heavy-bedded limestone, and the Nashville begins with a silicious, blue calcareous rock, weathering often, into thin, earthy, buff, sandy masses, and, sometimes, into shales. The bed is distinguished by the abundanee of *Orthis testudinaria* and *Strophonema alternata*, while the upper Trenton beds contain *Stromatopora rugosa*, *Columnaria alveolata*, *Petraria profunda*, *Strophonema filitexta*, *Rhynchonella recurvirostra*, *Pleurotomaria lapicida*, *Orthoceras Huronense*, etc.

"The Orthis bed is frequently a group of smoothly laminated flags, interstratified with shaly seams, when wet it looks much like the 'Black Shale.' At almost all points where it comes to the surface throughout middle Tennessee, it is seen to contain vast numbers of individuals of *Orthis testudinaria*.

"In the western valley of Tennessee it is the hydraulic rock and the most conspicuous of the Nashville strata. Along the Tennessee river it is seen at the base of several bluffs, its dark band on a level with the water and in strong contrast with the lighter beds, and gray limestones of the high bluffs above.

"The upper members of the Nashville group, constitute a group of rather dark blue, highly fossiliferous, often roughly bedded, impure, limestones of a maximum thickness of 400 feet."

The preceding descriptions, selected from the various authors who have published details of the character and sequence of the strata of the area and geological horizon over which our examinations have taken us, proving the existence of a widespread change in the physical condition of the sea of the Appalachian basin at the close of the Trenton limestone formation, and preceding that of the coarser and more varied sediments of the Hudson River formation, are given as a basis for including the Utica shale, Galena limestone, Triarthrus beds of Cincinnati, and the Orthis bed of the Nashville series, in one geological epoch; we might also add the Thebes sandstone and a portion of the Graptolitic shales of Virginia, Tennessee and Alabama.

All along the margins of the great Appalachian basin, from Anticosti to Lake Huron, to Minnesota, to Alabama and thence northeast to the St. Lawrence, the change at the close of the Trenton limestone-forming period, in the lithological characters and the fauna, is everywhere apparent; in some localities quite marked and abrupt; in others the horizon is nearly lost by the blending of both the strata and organic remains of the lower with the next succeeding formation. The organic remains of the Utica slate entitle it to rank as a formation quite as much as its lithological character. one

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hundred species known to the writer as occurring therein, fifty-four are peculiar to it and not known above or below its horizon. The graptolites are the most constant forms but over a great area the *Triarthrus Becki* is only second to them. The few individuals of the species of trilobite that have been found in the Trenton limestone were in the upper shaly limestone, which was deposited when the conditions bringing about the Utica slate deposit were being introduced.

Triarthrus Becki and the various forms of graptolites appear to have been, notwithstanding their fragile character, peculiarly adapted to spread over an extended area in the muddy bed of the sea, while the clearer limestone-forming seas were not favorable to the development of the trilobite and to but few species of the graptolites; the trilobite has not been found to the knowledge of the writer to the north-west, west, or south of the Cincinnati exposure. That this trilobite and the graptolites should have obtained so wide a geographical distribution is evidence of the comparative slow deposition of the sediments forming the Utica slate; this view is also strengthened by the presence of the large and fully developed *Asaphus Halli* and *Asaphus Canadensis* at Collingwood, where the shales are filled with their remains and those of graptolites, brachiopods and orthoceratites.

The return of conditions favorable to the existence and extension of the graptolites and *Triarthrus Becki*, at the commencement of the deposition of the Hudson River formation in Illinois, Wisconsin and Iowa, would have undoubtedly led to their extension to the west, either by the way of the central basin or the northern coast line, had they not been replaced by the fauna of the later beds at Cincinnati. I would regard the deposition of the sediment forming the Galena limestone as going on during and after the deposition of the Triarthrus beds at Cincinnati; the calcareous marls and sediments of the Hudson River formation over the central basin, to the west of the extension of the Utica formation, gradually forcing their way, towards the close of the epoch, over the Galena limestone-forming area, and eventually burying it beneath a deposit of shales and preventing for a time the deposition of the sediments forming the magnesian limestones, so characteristic of the western side of the Appalachian basin.

The shales resting on the Galena limestone in Wisconsin and Iowa, cannot, in the writer's view, be considered as the possible or probable equivalent of the Utica slate. There is no similarity in the fauna and the fact of their being somewhat carbonaceous is not sufficient to correlate them.

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The Galena limestone in its north-eastern extension commences as a comparatively thin formation and augments in volume to the west and south-west. In the north and north-western exposures, it is essentially a connecting link or bed of passage between the Trenton and Hudson formations. Distinct, lithologically and palæontologically, when viewed by itself, as is the Utica slate, still, on the same grounds, it is united to the formations above and below. To the underlying Trenton it is connected by beds of passage and the presence of fifty-six species of fossils found in the Trenton, twenty-nine of which do not pass upward into the Hudson River formation. In the north-eastern portion it partakes of the character, in its upper beds, of the succeeding beds, and thirty species continue on into the Hudson River formation, while nineteen species of fossils are limited to the Galena.

The following table gives the number of species in each of the two formations, viz.: Utica and Galena.

	Utica.	Galena.
Total number of species,[1]	100	78
Number of species limited to the formation,	54	19
Number of species limited to the formation and Trenton group,	11	29
Number of species limited to the formation and the Hudson River formation,	11	3
Number of species common to the Trenton, Hudson River, and U. and G. formations,	24	27
Number of species passing from the Trenton formation to Utica and Galena,	35	56
Number of species passing from the Utica or Galena to the Hudson River formation,	35	30

The table shows that a greater change took place in the fauna of the Utica slate than in that of the Galena limestone; the former having fifty-four species limited to its boundaries, and thirty-six derived from the Trenton; while the latter has nineteen species peculiar to it, and fifty-six passing up from the Trenton formation beneath. This diversity is undoubtedly owing to the greater variation in the character of the sediments of the Utica slate as compared with the Galena, when the change from the Trenton limestone-forming deposit occurred. One of the strongest arguments in favor of the Galena being placed with the Utica slate in a distinct epoch is the fact that, notwithstanding its being a limestone formation, it has a fauna of twenty-two species, which do not occur in the Trenton and but three pass to the Hudson River formations. If the Utica slate

[1] This does not include the undefined species from the Galena, mentioned in the *Geology of Wisconsin*, II, 1877.

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can be taken from the Hudson River group and considered a distinct formation then the Galena is to be ranked in the same way, both on account of its lithological characters and the peculiarity of its fauna. To the superior formation the Galena is united by passage beds and thirty species of fossils, while the Utica slate has but two more species and a somewhat closer union by its lithological characters.

Both the Thebes sandstone and the Orthis bed of Tennessee give expression to the epoch following that of the Trenton and, although inferior in volume and character of imbedded fossils to the Utica and Galena, they unite with the Triarthrus beds of Cincinnati to establish the Utica horizon over the central Appalachian basin, at the close of the Trenton limestone-forming epoch.

In conclusion, it is to be considered, that, although an exact equivalency in time cannot be asserted for the deposition of the Utica and Galena formations, the facts presented afford strong evidence of their belonging to the same geological epoch, and considered with the beds mentioned above in the central basin, they form a distinct geological horizon in the Trenton period, separating and distinguishing the two great divisions, the Trenton and Hudson River.

The Utica horizon will then include :
The Utica slate.
The Galena limestone.
The Triarthrus beds of Cincinnati.
The Orthis bed of Tennessee.
The Thebes sandstone.
Graptolitic shales, in part, of Virginia, Tennessee and Alabama.

We have observed that there is a well defined and distinct horizon between the Trenton and Hudson River formations along the Hudson and Mohawk valleys, which extends throughout the Appalachian basin. With this in view there can be but one series of terms to express the divisions of Prof. Dana's *Trenton period.*

They are :

HUDSON EPOCH.
UTICA EPOCH.
TRENTON EPOCH.

The term *Cincinnati epoch* cannot be substituted for that of Hudson River, without violence to accepted rules of nomenclature. The term Nashville group has priority and both are synonymous with the much older term Hudson River. The Hudson epoch, as used above, includes the original Hudson River group of the

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New York geologists above the Utica slate horizon, and the same strata in Pennsylvania and Canada and their western extension designated as the Nashville and Cincinnati groups.

Suplementary Note.

This paper was prepared in January of this year, 1879, and as the third volume of the *Geology of Ohio* was not received until late in February, the following references are added as bearing on the nomenclature adopted by the writer in speaking of the Hudson River group.

Prof. J. S. Newberry has a reference in the third volume of the *Geology of Ohio*, which mentions the statements made in the first volume of the same work, relating to the propriety of retaining the term Cincinnati group, for the strata exposed in southern Ohio which have received that name.

On page 3 of the third volume the following passage occurs :

"In the state of New York, the differences between the Trenton and the Hudson groups, are chiefly local and lithological nearly all the fossils of the Hudson being found in the Trenton. The only fossils characteristic of the Utica slate, are graptolites which seem to have grown in great profusion in certain shallow and quiet parts of the lower Silurian sea."

The difference between the Trenton and Hudson groups, as established in New York are not local or entirely lithological. From Lake Huron, across the province of Ontario to New York State and thence by the way of the Black river, Mohawk, Hudson, Lake Champlain and St. Lawrence valleys to Anticosti and south-west from the valley of the Hudson to Virginia, the differences are essentially the same. The black, bituminous shale forms a distinct horizon between the Trenton and Hudson groups.

Viewed in its palæontological aspect we find one hundred species of fossils, fifty-four of which are limited to the formation (Utica), of these thirty-three are graptolites in nine genera. There are also of

Algæ,	3 genera,	4 species.	
Bryozoa,	1 genus,	1	"
Brachiopoda,	2 genera,	3	"
Lamellibranchiata,	3 "	3	"
Gasteropoda,	1 genus,	1	"
Cephalopoda,	1 "	1	"
Pteropoda,	1 "	1	"
Crustacea,	2 genera,	7	"

[1] *Proc. Amer. Assoc. Advt. Sci.*, 1877.

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This gives a distinct palæontological horizon of twenty-one species in fourteen genera without the addition of the graptolites and *Triarthrus Becki.* Fifty-four species distributed in twenty-three genera, should sufficiently establish the palæontological record of the Utica slate as a distinct formation.

In the *Science News* of March 15th 1877, Prof. C. H. Hitchcock, in an article under the title "Lorraine Group," reviews the nomenclature of the strata composing the Trenton series or Trenton period.

"The proposition to substitute *Cincinnati period* for the term Trenton period is one that increases the confusion which is connected with the name Cincinnati."

As Prof. Hitchcock admits the presence of the Utica slate horizon at Cincinnati, he does away with the last reason for retaining the term Cincinnati, as applied to any *group, epoch* or *period* of Lower Silurian rocks. On page 153, he says :[1]

"The majority of the official board of New York geologists agreed that the name Hudson River should be applied to *all* the slaty and gritty rocks lying in the Hudson valley from the Highlands to Lake Champlain ; while their jointly published map adds the synonomy of Lorraine."

In the *Report of the First Geological District,* Prof. Wm. H. Mather says, p. 380 :

"We have thus far described some of the characters and phenomena of the Hudson River rocks, on the right bank of the Hudson, and have kept them distinct from those of the left bank, because they are much more deranged on the east side of the river, by several fractures and lines of upheave parallel to the main axis, extending north and south, and also by transverse fractures and lines of upheave, that have deranged *all the rocks of the Champlain division,* and packed them together, helter-skelter, in the utmost confusion. They are contorted, broken and wrinkled, in almost every conceivable manner, in the vicinity of the intersections of these fractures and axes of disturbance; and although the lines of bearing and dip of the strata are nearly uniform in their *direction* (* * * * *) except near the intersections of the fractures and axes of disturbance, yet the repetitions of the same strata so variously, with others lying higher and lower in the geological series, and with frequent apparent inversions of the order of superposition, renders it almost impossible to determine from an examination of the strata on the *east* bank of the Hudson, what the real order of superposition is. * * * * * * Fortunately, nearly all the strata of the Champlain division are exposed in the valley of the Mohawk, unchanged in position and in some places along the west side of the main axis they may be examined in the order of superposition indicated in the tabular arrangement of the rocks of that division."

Prof. Mather was the geologist in whose district the strata in

[1] *Ibid.*

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discussion are situated. His official report contains the above. On page 366 he says :

"The division of the fossiliferous rocks of the first geological district, as proposed in the Fourth Annual Report (1840), was one of convenience, and founded in nature, and as affording means of easily tracing the groups of strata. This division of the rocks has been substantially sustained by the Board of Geologists, the Hudson slate series being divided into the Champlain division and Taconic system, etc."

Prof. Mather recognized the presence of the lower members of the Champlain division in the confused strata on the east side of the Hudson. He *established* the Hudson River group on the west side and then referred the strata on the east side, in many places with doubt, to it. The correctness of the original reference and its acceptance by the Board of Geologists is a fact in the history of the survey.

The use of the term Lorraine group is not admissible, as the term Hudson River antedates it, and Lorraine was placed as a synonym by the Board of Geologists who agreed upon the nomenclature of the New York system of rocks. The facts presented by Prof. Mather upon which the term Hudson River group was established, have not been materially changed by subsequent investigations. Mr. Dale's discovery of an old locality given by Mather and Mr. Ford's verification of the presence of a lower member of the Champlain division by palæontological evidence, being the two instances cited in the article by Prof. Hitchcock.

In a very interesting paper on the "Hudson River Age of the Taconic Schists" (*Amer. Jour. Sci., Arts*, pp. 375–388, May 1879), Prof. J. D. Dana shows that the Taconic schists are, according to the evidence presented, of the age of the Hudson River group and that the five limestone belts mentioned are of Lower Silurian age, thus arriving at conclusions partially coinciding with those of Prof. Mather.

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FOSSILS OF THE UTICA SLATE.

[Read before the Albany Institute, March 18, 1879.]

By C. D. Walcott.

It is not designed under the above title to present a detailed description of the various fossils found in the Utica slate formation, but to give a list of those occurring in it, with references to publications where descriptions of the species mentioned may be found; also descriptions of some new species not hitherto known in the formation, and a notice of the development, or metamorphoses as far as now known, of its characteristic trilobite *Triarthrus Becki*.

CYATHOPHYCUS *nov. gen.*

Κύαθος — *a cup*; Φῦκος — *a sea weed.*

Hollow membraneous fronds with an opening at the upper extremity of the frond, elongate or hemispherical in form; reticulate or plain structure.

The type of the genus *Cyathophycus reticulatus*, resembles in its tubular, hollow, membraneous frond, with a recticulated structure, the recent genus of algæ Enteromorpha.

Cyathophycus reticulatus *n. sp.*

Plate II, figures 16, 16 a — d.

Elongate, tubular, hollow fronds; membraneous, with a strong reticulated structure; opening at the summit circular, usually a little smaller than the diameter of the frond, and sometimes with a thickened margin; the thickened cell walls are arranged in longitudinal and transverse lines, giving the reticulated appearance, even in poorly preserved specimens.

The longitudinal lines of cell walls converge and unite at the base to form a short obtuse stem or root.

The fronds vary in length from one and one-half to twenty-three centimetres and in form from long tubular to broad cup shaped.

This rare and beautiful alga is associated with graptolites;— Dendrograptus, Climacograptus — *Endoceras proteiforme* and *Triarthrus Becki*. Specimens of a small undetermined Pleurotomaria are attached to several fronds.

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Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

CYATHOPHYCUS SUBSPHERICUS *n. sp.*

Plate II, figure 17.

Hollow membraneous fronds with a circular opening at the apex of a nearly hemispheric body.

This species is less firm in structure than the proceeding, there being no thickening of the cell walls to give the reticulated appearrance and to preserve the form, which varies from circular to oval as if a hemispheric body had been pressed flat. In an example three centimetres in diameter, the circular opening is nine millimetres in diameter.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

DISCOPHYCUS *nov. gen.*

Δίσκος — *a disk ;* Φῦκος — *a sea weed.*

Discoid, slightly convex fronds ; circular or orbicular in outline substance coriaceous.

DISCOPHYCUS TYPICALIS *n. sp.*

Plate II, figures 18, 18a.

Frond discoid, more or less convex owing to degree of compression. Outline clearly defined, varies from circular to orbicular when unbroken before being imbedded in the sediment, assumes various shapes when broken and pressed out. The substance appears to have been of a coriaceous nature as it is slightly corrugated on the outer margin in some fronds, and frequently shells of the genera ORTHIS and PTERINEA are attached to it, forming small colonies upon the smooth, dark lustrous surface. In several large entire, and also fragmentary, specimens the outer margin appears as though a gelatinous or carnose body had been pressed flat between the layers of shale.

Fronds vary in size from four to twelve centimetres in diameter.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

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Genus — GRAPTOLITHUS Linnæus 1736.

Plate I, figures 2, 2a.

Graptolithus annectans *n. sp.*

Frond consisting of two slender flexuous stipes which are widely divergent from a small short obtuse radical. The stipes curve slightly upward at their origin and then outward and obliquely downward; semi-cylindrical at the base, they become more flattened at the extremities.

Diameter at and near the base one-half of a millimetre, near the extremities one millimetre. Test strong and thick; surface apparently smooth.

Cellules long, narrow, curving gently toward the aperture, making an angle with the axis of the stipe of about 20°. The apertures of the cellules are about one millimetre apart; the point of the denticle or aperture is falcate curving over the cellule so as to nearly close it midway. The walls of the cellules are thickened giving a tumid appearance to the cell denticle, and forming a small pustule in advance of the base of each cellule.

The form and proportion of the stipe is similar to that of *Graptolithus flaccidus*, Hall. The cellules are quite different.

Formation and locallty, Utica slate, town of Trenton, Oneida Co., N. Y.

Genus — DENDROGRAPTUS Hall 1865.

Dendrograptus simplex *n. sp.*

Plate I, figures 5, 5 a, b, 6.

Stipe long, slender, flattened. Branches of nearly a uniform character with the stipe bifurcating from it at regular distances; both celluliferous and noncelluliferous surface apparently smooth. Cellules simple, slightly elongated, depressions, from two and one-half to three millimetres distance from each other, on the central depressed portion of the branches. Substance of the stipe and branches corneous and from the evidence of compression probably tubular.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

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Dendrograptus tenuiramosus *n. sp.*

Plate 1, figure 4.

Stipe slender, compressed ; branches bifurcate from it irregularly, frequently sub-dividing, terminating in filiform extremities ; surface apparently smooth. Celluliferous side with smooth simple round pits, or depressions along the center of the branches. Substance corneous and as in *Dendrograptus simplex* probably tubular.

The compression of the tubular stipe and branches forms a rim-like margin on each side of a central depressed area in which the cellules are seen, as in the specimen illustrated on Plate 1, fig. 5, 5, a, b.

The different mode of branching, the slender extension of the branches and the general appearance of the entire frond distinguishes it from the preceding species. From *Dendrograptus* (*Psilophyton*) *gracillimum* it is separated by having smaller cellules and less robust stipe and branches. In specimens received from Mr. S. A. Miller of Cincinnati, Ohio, identified as the *Psilophyton gracillimum* of Lesquereux, the cellules are larger and more elongated than in the species from the Utica slate, the stipe and branches show the same *compression* of an apparently corneous, hollow, tubular structure.

The resemblance of these two species of Dendrograptus to Lycopodiaceous plants of the genus Psilophyton is very striking and apt to mislead the observer. Their occurrence with algæ, graptolites, trilobites and brachiopods in the same layers of shale, in a position indicating their growth *in situ*, taken with their graptolitic structure, precludes the idea of their being of other than marine origin.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

Dendrograptus compactus *n. sp.*

Plate 1, figure 1.

Frond fan shaped ; branches comparatively coarse and numerous ; stipe below the branches unknown.

The specimen figured is the only one in the collection ; it is too much weathered to show the surface characters. The shape of the frond and the numerous and compact branches distinguish it from allied species of the same genus.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

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GENUS — SAGENELLA HALL 1852.

SAGENELLA AMBIGUA *n. sp.*

Plate I, figures 3, 3a.

Cells arranged in regular parallel series over most of the surface, quadrangular and oblong shaped in the parallel series, and where this series is broken they are more or less oval, several series are intercalated giving the cell walls the appearance of the bifurcating branches of a Dictyonema. The striations visible on the cell walls and transverse septa are owing to the impression of the striated surface of the shell of the Endoceras to which the bryozoan was attached.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

GENUS — MODIOLOPSIS HALL 1847.

MODIOLOPSIS CANCELLATA *n. sp.*

Plate I, figure 8, 8a.

General form subelliptical, convex; cardinal line nearly straight from the beak to the posterior margin; anterior end rounded from the cardinal line to the basal margin.

Basal line arcuate; posterior end obliquely truncate, umbonal ridge broadly rounded with a uniform convexity, to the basal margin.

Surface marked by strong concentric and radiating striæ, which are strongly developed on the posterior half of the shell; the crossing of the striæ gives a cancellated appearance which is not seen on the closely related *Modiolopsis anodontoides*. The broad umbonal ridge also distinguishes it from that species.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

GENUS — ORTHOCERAS BREYNIUS 1732.

ORTHOCERAS ONEIDAENSE *n. sp.*

Plate I, figure 7, 7a.

Besides the very common *Endoceras proteiforme*, which occurs in great numbers, there are two forms of Orthoceras in the beds from

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which so many rare specimens have been obtained. One is an annulated shell with strong longitudinal striations which have the appearance of having transverse striæ crossing them. The fragment is of the character of *Orthoceras* (*vertebrale*) *olorus* of the Trenton limestone. The other is a very slender, finely cancellated, shell different from any other form known to me; for the latter the name *Orthoceras Oneidaense* is proposed.

Formation and locality, Utica slate, town of Trenton, Oneida Co., N. Y.

Beyrichia Cincinnatiensis Miller.

This species occurs, associated with *Leperditia cylindrica* and *L. minutissima*, in the lower part of the slate on Rathbone's brook, Deerfield, Oneida Co., N. Y.

TRIARTHRUS BECKI Green 1832.

Brongniartia carcinoidea: Eaton 1832. *Geol. Text Book.*
Triarthrus Beckii: *Monthly Journal of Geology*, p. 560.
Triarthrus Beckii: Green 1832. *Monograph*, p. 87.
Triarthrus Beckii: 1835. *Trans. Geol. Soc. Penn.*, vol. I, p. 105.
Paradoxides arcuatus: Harlan, 1835. *Trans. Geol. Soc., Penn.*, vol. I, p. 265.
Paradoxides triarthrus: " " " " " " " " 264.
Paradoxides Beckii: Hall 1838. *Amer. Jour. Science*, vol. XXXIII, p. 137.
Paradoxides Eatoni: " " " " " " " "
Triarthrus beckii: Mather 1842 *Rep.*, 1*st District, Geol. N. Y.*, p. 390.
Triarthrus beckii: Emmons " " 2d " " " " 399.
Triarthrus beckii: Vanuxem, " " 3d " " " " 57.
Triarthrus Beckii: Hall, " " 4th, " " " " 504.
Atops trilineatus: Emmons 1844. *Taconic System*, p. 20.
Atops trilineatus: Emmons 1846. *Agr. Rept., N. Y.*, vol. I, p. 64.
Calymene Beckii: Hall 1847. *Pal. N. Y.*, vol. I, pp. 237, 250.
Triarthrus Beckii: Logan 1863. *Geology of Canada*, p. 202.
Triarthrus Becki: Barrande 1872. *Syst. Sil. Boheme.* vol. I, p. 259.
Triarthrus Becki: Miller 1874. *Cincinnati Jour. Science*, vol. I, p. 146.
Triarthrus Becki: Miller 1877, *Cat. Amer. Pal. Fossils*, p. 223.

Many references are omitted where the species is named *Triarthrus Becki*, as it has been so frequently referred to by authors. Numerous figures and detailed descriptions of the species are given in the first volume of the *Palæontology of New York.*

Before proceeding to the discussion of its metamorphoses, we will first notice the references that have been made to changes occurring in species of the genus Triarthrus by authors.

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1847. Prof. James Hall in vol. I, *Pal. N. Y*, p. 251, in describing *Calymene* (*Triarthrus*) *Becki* says:

"There is still some little difficulty in determining the number of articulations of the thorax, since the greater number of specimens are imperfect; and in a single large specimen there appear to be fourteen or fifteen. This fact indicates an increase in the number of thoracic rings with age, a character which EMMRICH has given of OLENUS."

1852. Prof. Barrande[1] in noticing the above remarks says.

"In a previous passage (p. 237) relating to the same species [*Calymene* (*Triarthrus*) *Becki*]. J. Hall regards it as having thirteen segments. The extent of the supposed variations in the number of thoracic elements will then be from thirteen to fifteen, this last limit, however, is given with some doubt. The numerous figures given by the author elsewhere, show that the materials at his disposal were incomplete. It seems to us then, before definitely admitting a progressive development, it is necessary to await new documents; as for the character attributed to the OLENUS by EMMRICH it comes from an error of observation."

1857. Prof. E. Billings comparing *Triarthrus Becki* with *Triarthrus spinosus*, which he then described as having thirteen thoracic segments, says:[2]

"In a well preserved specimen of *Triarthrus Becki* in the museum, there are distinctly fifteen segments in the thorax, and five in the axis of the pygidium, so that if these two species be congeneric, the number of articulations in the genus must be a variable character."

1872. Prof. J. Barrande gives *Triarthrus Billingsi* as having sixteen segments in the thorax (table, p. 116, vol. I, Pt. II, *Syst. Sil. Boheme*).

METAMORPHOSES OF TRIARTHRUS BECKI.

As the metamorphoses, or all changes experienced by a trilobite during its life, are given of *Triarthrus Becki* as far as known, the following quotations from Prof. J. Barrande's exhaustive discussion of the metamorphoses of the trilobites[3] are taken as a basis, as his work is the foundation upon which investigations in this line of research must be based:

"Whatever may have been the real extent of the modifications of form undergone by the trilobites from their leaving the egg to the adult age, it is clear that we can find traces of the transformation of their solid envelope, only! All the variations relating to the soft parts, such as the feet, antennæ, etc., which play so important a part

[1] *Systeme Silurien de la Boheme*, vol. I, p. 259.

[2] *Report of Progress, Geol. Survey, of Canada*, p. 340. 1857.

[3] Loc. cit., I, pp. 281, 282.

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in the metamorphoses of the living Phyllopodes (according to the description of Burmeister cited above), are forever effaced for us." [1]

"The Savant Professor of Halle (Burmeister) still teaches us that at the earliest age all the modern Phyllopodes — without exception — are naked, that is, deprived of all crustacean envelope, according to general analogies demonstrated by this savant, between this tribe and the trilobites, we can admit as very reasonable that at least a part of these ancient crustaceans were born in the same state of nudity."

Four orders of variations are characterized in the metamorphoses of the trilobites in which he has observed evidence of progressive development.

"They are as follows:

1st order.	Head predominating, incomplete. Thorax nothing or rudimentary. Pygidium nothing.	TYPE Sao hirsuta.
2d order.	Head distinct, incomplete. Thorax nothing. Pygidium distinct, incomplete.	TYPE Trinucleus ornatus and all the Agnostus.
3d order.	Head complete. Thorax distinct, incomplete. Pygidium distinct, incomplete.	TYPE Arethusina Konincki.
4th order.	Head complete. Thorax complete. Pygidium distinct incomplete.	TYPE Dalmanites Hausmanni.

"The two last sections are provisional and ought sooner or later to be merged into the one, or other of the two first."

We find *Triarthrus Becki* placed doubtfully at the end of the 3d order on the description given by Prof. Hall. We cannot remove it from that position, as the youngest stage we have shows one segment in the thorax, but from the changes that occur in its development, we cannot avoid the conclusion that with more complete material it will be removed to the 2d order, as the smallest individual is one millimetre in length and the head and pygidium are strongly lobed and well developed.

That the earlier degrees of development of *Sao hirsuta*, the type

[1] In the earlier degree of development of the trilobite, and for all preserved in the sediments of the character of those in Bohemia, this undoubtedly is true. Since the discovery [2] of the delicate spiral branchial apparatus of the trilobite, preserved in the fine grained limestones of the Trenton group, it is to be hoped that the time is not far distant when even some of the later changes in the progressive development of the so called soft parts may be discovered and give to the biologist more of the life history of this remarkable crustacean. We have a few facts sustaining this view which will be given in a paper on the anatomy and development of some trilobites of the Trenton limestone.

[2] 31st Report N. Y. State Museum of Natural History, 1878, and Preliminary N°tice, 1877.

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of the 1st order, will be discovered for *Triarthrus Becki* is extremely doubtful.

Degrees of Development.

First Degree. Plate II, figures 1, 1a and 15.— Of the four individuals indicating the first degree of development, as known at the present time, three have each a total length of one and one-eighth millimetres, and one of one millimetre the latter being proportionally broader than the former. The anterior and posterior extremities are broadly rounded, giving a general oval outline. The entire individual is strongly convex, and the two deeply impressed dorsal furrows give a marked convexity both to the central and lateral lobes.

The head and pygidium are distinctly separated by one thoracic segment and the trilobitic character is as essentially formed as in the later degrees of development. The head is a little more than one-half the entire length of the animal; the glabella is elongate, narrower at the base than at the anterior margin, and the glabellar furrows are indicated by straight transverse furrows penetrating one-third the distance across the glabella and are proportionately farther apart than in the fully developed glabella of the adult.

Occipital groove, transverse, deeply impressed. Occipital ring, convex, rising in the center to form the base of a small node, or short spine; transverse anteriorly, it slopes each way from the center of the posterior margin to half the width at the lateral margins. The dorsal grooves do not extend in a direct line with the sides of the glabella, as in the adult, but turn obliquely outward, across the occipital segment at the base of the glabella, giving a constricted appearance to the central lobe of the head at the occipital groove. Fixed cheeks convex, broad at the base, nearly equaling the width of the posterior margin of the glabella; posterior groove very clearly defined, extending across on a line with the posterior margin of the occipital segment, curving slightly forward near the lateral margin; the posterior margin is a rather narrow elevated rim. The eyes and free cheeks are not discernible in any of the examples of this degree; it may be owing to the condition of their preservation as it is often difficult to discover these parts in the third degree of development.

The thorax is shown by the presence of one segment. The pleuræ are grooved as in the later degrees of development and the characteristic spine upon the center of the axis is distinctly shown.

The pygidium is strongly lobed; the deep dorsal furrows giving

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prominence to the strongly convex axis. The five rings crossing it are prominent and sharply defined; the last is scarcely more than a transverse node as the axis tapers to a point within the posterior margin. The anterior ring of the lateral lobes shows a pleural groove crossing it obliquely which separates a small lobe or elongate margin between it and the thoracic segment, a feature which is persistent to the adult; the three posterior rings are simple rounded pleuræ curving slightly backward toward the margin; the representative of the last ring of the axis is a broad expansion of the last segment extending across the posterior margin.

Second Degree. Plate II, figure 2. — All parts have increased in size but not proportionally. The table (p. 32), illustrates this very completely, as it does for all the degrees of development. The glabella has widened, and the occipital ring narrowed slightly at the center. The free cheek is seen as a narrow rim. The eye is indicated by a very small groove on the outer border of the fixed cheek which in the later stages of growth separates the palpebral lobe from the fixed cheek.

The thoracic segments are convex; each is raised at the center to form the base of a short spine. This spine is very prominent in all well preserved specimens, from the first to the last degree of development. The pleuræ are very convex on each side of the pleural groove; they terminate nearly the same as in the adult.

Third, Fourth and Fifth Degrees. Plate II, figures 3, 4 and 5. — The details of the development in size may be seen by a glance at the table. The spine on the axis of each thoracic segment appears with it, as it must from the fact that we find the spine on the axis of the first anterior segment of the pygidium, and frequently on the second when the pygidium has six rings in the axis, as it does in individuals having from three to seven segments in the thorax. With a sufficient amount of material we would probably find this to hold good in all the degrees of development as was observed by M. Barrande, the thoracic segments were first elaborated in the pygidium before being liberated in the thorax. In one very perfect example, with five segments in the axis of the thorax and six in the pygidium, the first three anterior segments of the pygidium have the spine upon them.

Sixth Degree. Plate II, figure 6. — At this stage all the parts have attained most of the characters of the adult.

The glabella has gradually expanded towards the base so that its

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sides are almost parallel, the glabella furrows have become oblique to the axis of the glabella and assumed the slight curvature that appears in the adult. The cheeks have not developed as rapidly as the glabella being now proportionally narrower. The eyes and free cheeks also appear to have been retarded in a measure, but their small size, and the fact that they are almost invariably broken away or pressed under the head renders a study of them very difficult.

The proportions of the head, thorax and pygidium vary proportionately up to the adult. Each deep dorsal groove extends the entire length of the body with a gentle curvature near the pygidium and uniting at the posterior extremity of the axis of the pygidium.

The pygidium retains more of the characters of the first degree than either the head or thorax.

Seventh to Thirteenth Degrees. Plate II, figures 7–12. — The development of the thorax continues by the addition of segments, while all parts increase in size, with the development of the individual. The strong convexity of the earlier stages is reduced, and with it, the very deep dorsal furrows. The entire expression assumes that of the adult. The examples of the 12th degree are uniform with the smaller individuals of the 13th and 14th from the same locality.

Twelfth Degree to complete development in size. Plate II, figures 13 and 14. — With the exception of the reference made by Professor J. Hall to the presence of fourteen to fifteen segments in a single individual and Mr. Billings to fifteen, *Triarthrus Becki* has been described as having thirteen segments in the thorax, this must have been the usual number of segments met with by authors who have had the species under consideration. This result has not been obtained in our researches. Of forty-one examples, having respectively thirteen, fourteen, fifteen and sixteen segments in the thorax, six have thirteen, twenty-five have fourteen, seven have fifteen and three show sixteen.

The fully developed adult of sixteen segments varies but little, with the exception of size, from the smaller individual of thirteen segments. The larger adults are usually flattened by compression, while the smaller individuals preserve the natural convexity of the shell; but when the conditions of preservation are considered the larger are less convex when in a natural condition as is shown by the transverse flattening of the segments in the axis of the thorax and the greater expansion of the pygidium when the evidence of compression is very slight. Upon the glabella we find in the larger speci-

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mens the third pair of glabella furrows[1] and the peculiar short transverse furrows. Plate II, figure 14.

Periods of Development.

Professor J. Barrande divides the development of *Sao hirsuta* into two periods. The first includes all the degrees from the first, when there is no thoracic segment or pygidium defined, to the nineteenth, when there are seventeen liberated segments in the thorax and two in the pygidium.

The second period extends from the last (nineteenth) to the complete development in size and ornamentation.

It is difficult to establish two periods in the development of *Triarthrus Becki;* there is no change in the ornamentation, as it is the same in individuals of from thirteen to sixteen thoracic segments. There is a certain increase in size after the sixteenth segment is liberated in the thorax, but not of sufficient importance to indicate a period of development. If any change is to be noted, it is, that, after the development of the twelfth segment, individuals having the same number of thoracic segments vary very much in size, some even being smaller than those having a lesser number of segments; this period of development is a marked one in the history of this trilobite; as shown by the table following an individual of thirteen thoracic segments is larger than one having sixteen. Again we find that an individual of thirteen thoracic segments is more than three times as large as one with fourteen, one being twenty-four and the other seven millimetres in length; that the largest with fourteen segments, thirty millimetres in length, is nearly double the smallest with sixteen segments, and that the adult individual of sixteen thoracic segments is fifty-three millimetres in length. Minor variations have been noticed in individuals having less than thirteen thoracic segments but in no case has the size of the one having the lesser number of segments exceeded the next in the series of development. It is not until the twelfth degree of development is passed that this strange anomaly occurs. Until a much greater quantity of material is studied we should not be willing to make a division and call this a second period of development, as such a great degree of variation occurs in this trilobite that our having but three examples of the twelfth degree of development forbids such a separation except, provisionally, for reference.

[1] Seen in individuals of ten millimetres, and upwards, in length.

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It corroborates in a remarkable degree the observations of M. Barrande on the development of *Arethusina Koninckí*, and the changes in *Proetus venustulus;* of the latter he says: [1]

"The specimen of ten segments is absolutely smaller than most of those having but nine. Plate XV of the same work shows that in *Arethusina Koninckí* the size of the individual is not proportionate to the number of liberated segments in the thorax."

The following table shows the variations in *Triarthrus Beckí* of individuals having from thirteen to sixteen segments.

Number of segments in the Thorax	Entire Length	Head	Thorax	Pygidium
	mm.	mm.	mm.	mm.
Thirteen	7.00	2.50	3.75	.75
Thirteen	24.00	7.50	14.00	2.50
Fourteen	7.00	2.50	3.75	.75
Fourteen	12.50	4.00	7.00	1.25
Fourteen	17.00	5.00	10.50	1.50
Fourteen	25.50	7.50	15.50	2.50
Fourteen	30.00	9.00	18.50	2.50
Fifteen	19.00	5.50	11.50	2 50
Fifteen	28.00	8.50	17.00	2.50
Fifteen	48.00	12.00	31.00	5.00
Sixteen	16.50	5.00	10.00	1.50
Sixteen	23.00	7.00	14.00	2.00
Sixteen	53.00	15.00	33.00	5.00

The two pair of slight depressions, seen on the anterior part of the glabella in the adult, have not been observed in any individual with less than thirteen segments in the thorax.

Comparison of Parts during Development.

In comparing the two extremes of development as known to us, we notice the relative proportions of the different parts of the body. In the adult having sixteen thoracic segments the head is twenty-six and two-thirds times larger, the thorax 528 times, and the pygidium ten times larger than the same parts in the first degree of development. The head is broad in proportion to the length; the glabella is rectilinear, and equal to the width of both cheeks; the glabella furrows are oblique and curved slightly backward, instead of being

[1] *Silurien Systeme de la Boheme*, I, p. 269.

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tranverse, the dorsal furrows are less strongly defined, the occipital segment is transverse and of the same width all across, the occipital spine being proportionately smaller; changes of equal extent characterize the thorax and pygidium. A comparison of the figures on Pl. II, will enable the palæontologist to judge of these differences in the two extreme forms of development; between these the changes from one degree to another are so gradual that it is difficult to note where one form begins or the other disappears.

There is a variation in the pygidium of the last four degrees of development, that is not at all constant, the last ring in the axis of the pygidium merges into the margin, so that there appears to be but four rings in the axis; as they are usually developed in the same space, it is not noticed in the table, and five, the usual number in the axis of the pygidium, is given.

Table of Development.

The first line indicates the number of thoracic segments and the degree of development; the second, the entire length of the average individual of each degree; the succeeding three, the length of the head, thorax and pygidium. As it is difficult to compare the relative proportions of different parts of individuals of the different degrees when expressed in fractions of the millimetre the succeeding three divisions are so arranged to enable this to be done readily; they are based on dividing the millimetre in sixteen equal parts. By them any part of an individual can be compared with any part of an individual of any other degree of development. With a sufficient number of examples of each degree, a series might undoubtedly be selected showing a regular proportional development of all the parts throughout the series; this table is based on the material we now have in the collections mentioned in the table.

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Degrees of Development.		Number of Segments in the Thorax.	Number of Segments in Axis of the Pygidium.	Length of entire individual.	Length of Head.	Length of Thorax.	Length of Pygidium.	Relative proportions of Head, Thorax and Pygidium based on dividing the millimetre into 16 parts.			Number of examples in C. D. Walcott's collection.	Mr. Hurlburt's collection.	Other collections.
								Hd.	Th.	Pg.			
				mm.	mm.	mm.	mm.	mm.					
1	....	1	5	1.12	.5625	.0625	.5000	9	1	8	3	1	
2	....	2	5	1.50	.6865	.1750	.6250	11	3	10	4		
3	....	3	5–6	2.00	.8750	.5000	.6250	14	8	10	15		
4	....	4	5–6	2.25	1.0000	.6250	.6250	16	10	10	16	2	
5	....	5	5–6	2.50	1.0000	.8125	.6875	16	13	11	17	2	
6	....	6	5–6	3.00	1.1250	1.1250	.7500	18	18	12	3	4	
7	....	7	5–6	3.50	1.3750	1.3750	.7500	22	22	12	9	1	
8	....	8	5	4.00	1.5000	1.7500	.7500	24	28	12	9		
9	....	9	5	4.50	1.7500	2.0000	.7500	28	32	12	3	3	
10	....	10	5	5.00	1.8750	2.2500	.8750	30	36	14	7	1	
11	....	11	5	5.50	2.0000	2.6250	.8750	32	42	14	3	1	
12	....	12	5	7.00	2.5000	3.7500	.7500	40	60	12	3		
13	min.	13	5	7.00	2.5000	3.7500	.7500	40	60	12	3	..	3[2]
13	max.	13	5	24.00	7.5000	14.0000	2.5000	120	224	40			
14	min.	14	5	[1]7.00	2.5000	3.7500	.7500	40	60	12	19	5	1[1]
14	max.	14	5	30.00	9.0000	18.5000	2.5000	144	296	40			
15	min.	15	5	19.00	5.5000	11.5000	2.0000	88	184	32	...	..	7[2]
15	max.	15	5	48.00	12.0000	31.0000	5.0000	192	496	80	...	..	1[3]
16	min.	16	5	[1]16.50	5.0000	10.0000	1.5000	80	160	24	2	..	1[1]
16	max.	16	5	53.00	15.0000	33.0000	5.0000	240	528	80			
—	——	—	—	——	——	——	——	—	—	—	——	——	——
											116	20	13

Ornamentation.

The characteristic and only ornament is the spine[4] which occurs upon the centre of each segment of the thorax, the occipital segment and the anterior segments of the pygidium. It is to be seen from the first degree as at present known to the sixteenth. Upon the thoracic segments of the adult of the latter degree, the spine bends

[1] From Cincinnati, Ohio, Mr. Dyer's collection.

[2] N. Y. State Museum collections, from N. Y. State.

[3] *Geology of Canada*, p. 202. 1863.

[4] Prof. Hall considers this the most prominent character of this species, *Pal. N. Y.*, I, p. 251.

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slightly backward. This ornamentation is of an embryonic character as is shown by its greater proportional development in the younger stages of growth. In the first degree its base occupies one-third of the entire surface of the occipital segment. *Triarthrus spinosus*, Billings, has but two spines, one on the occipital segment, and one on the eighth segment of the thorax. Both are long and curved backward, the one on the thorax resembling the spine on the thorax of some species in the genus CYPHASPIS.

The above closes our observations on the metamorphoses of *Triarthrus Becki*. Taken with Mr. Ford's discovery of the earlier metamorphoses of *Olenellus* (*Elliptocephalus*) *asaphoides*,[1] we have illustrations from American strata of the first and third order of Barrande. If collectors will pay attention to the very small specimens of trilobites, there is little doubt, but that other genera and species will be added to the list. We have *Asaphus platycephalus?* showing three segments in the thorax, and *Illœnus Milleri*, Billings, with ten, the usual number being nine.[2]

Acknowledgment. To Mr. C. B. Dyer, and Mr. S. A. Miller, of Cincinnati, Ohio, Mr. E. Hurlburt of Utica, and Rev. Wm. N. Cleveland, of Holland Patent, N. Y., I am indebted for the loan of specimens. It was due to the efforts of Mr. William P. Rust, of Trenton Falls, N. Y., that the large collection of trilobites was obtained and also the rare graptolites and algæ.

To Prof. James Hall, I am indebted both for access to the New York State Museum collections and to his private library for works of reference.

[1] *Amer. Jour. Science and Arts*, vol. XIII. 1877.

[2] *Can. Nat. and Geol.* 1859.

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CATALOGUE OF FOSSILS OCCURRING IN THE UTICA SLATE.

Genera and Species.	Authority and Reference.	Chazy.	B. and B. R.	Trenton.	Utica Slate 1.	Utica Slate 2.[1]	Hudson River.
Cyathophycus reticulatus,	Walcott, 1879, Trans. Albany Inst., x, p. 18	..	..	..	*	..	..
Cyathophycus subsphericus,	" " " " " p. 19	..	..	..	*	..	..
Discophycus typicalis,	" " " " " p. 19	..	..	..	*	..	..
Sphenothallus angustifolius,	Hall, 1847, Pal. N. Y., I, p. 261	..	..	..	*	..	..
Climacograptus bicornis,	Hall, 1847, (*Graptolithus bicornis*) Hall, Pal. N. Y., I, p. 268	..	..	..	*	*	*
Climacograptus parvus,	Hall, 1865, Can. Organic Remains, Decade II, p. 57	..	..	..	..	*	..
Climacograptus typicalis,	Hall, 1865, Can. Organic Remains Decade II, p. 57	..	..	..	*	*	*
Dendrograptus compactus,	Walcott, 1879, Trans. Albany Inst., x, p. 21	..	..	..	*	..	..
Dendrograptus simplex,	" " " " " p. 20	..	..	..	*	..	..
Dendrograptus tenuiramosus,	" " " " " p. 21	..	..	..	*	..	..
Dicranograptus divaricatus,	Hall, 1859 (*Graptolithus divaricatus* Hall), Pal. N. Y., III, p. 513	..	..	..	.	*	..
Dicranograptus furcatus,	Hall, 1847 (*Graptolithus furcatus* Hall), Pal. N. Y., I, p. 273	..	..	..	..	*	..
Dicranograptus ramosus,	Hall, 1847 (*Graptolithus ramosus* Hall), Pal. N. Y., I, p. 270	.	..	..	*	*	..
Dicranograptus sextans,	Hall, 1847 (*Graptolithus sextans* Hall), Pal. N. Y., I, p. 273	..	..	..	..	*	..
Diplograptus angustifolius,	Hall, 1859 (*Graptolithus angustifolius* Hall), Pal. N. Y., III, p. 515	..	..	..	..	*	..
Diplograptus ciliatus,	Emmons, 1856, Amer. Geol., I, Pt. II, p. 105	..	.	..	..	*	..
Diplograptus marcidus,	Hall, 1859 (*Graptolithus marcidus* Hall), Pal. N. Y., III, p. 514	..	.	.	..	*	..
Diplograptus mucronatus,	Hall, 1847 (*Graptolithus mucronatus* Hall), Pal. N. Y., I, p. 268	..	..	..	*	*	..
Diplograptus pristis,	Hall, 1847 (Hisinger? *Graptolithus pristis* Hall), Pal. N. Y., I, p. 265	..	..	..	*	*	*

[1] Utica slate; outcrops in the Hudson river valley.

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Diplograptus putillus,	Hall, 1865, Can. Organic Remains, Dec. II, p. 56	..	..	..	..	*	..
Diplograptus secalinus,	Eaton (Hall) 1847, *Fucoides secalinus* Eaton), Pal. N. Y., I, p. 267	..	..	..	..	*	..
Diplograptus spinulosus,	Hall, 1859 (*Graptolithus spinulosus* Hall), Pal. N. Y., III, p. 517	..	..	..	..	*	..
Diplograptus Whitfieldi,	Hall, 1859 (*Graphtolitus Whitfieldi* Hall), Pal. Y., III, p. 516	..	..	..	..	*	..
Graptolithus annectans,	Walcott, 1879, Trans. Albany Inst., X, p. 20.,	..	..	..	*	..	..
Graptolithus divergens,	Hall, 1859, Pal. N. Y., III, p. 509	..	..	..	..	*	..
Graptolithus flaccidus,	Hall, 1865, Can. Organic Remains, Dec. II, p. 143	..	..	..	*	..	..
Graptolithus gracilis,	Hall, 1859, Pal. N. Y.,III, p. 510	..	..	..	..	*	..
Graptolithus lævis,	Hall, 1847, Pal. N. Y., I, p. 274	..	..	..	..	*	
Graptolithus multifasciatus,	Hall, 1865, Can. Organic Remains Dec., II, pp. 10, 99	..	..	..	..	*	..
Graptolithus quadrimucronatus,	Hall, 1865, " " " " " p. 144	..	..	..	*	..	..
Graptolithus scalaris,	Linnæus (Vanuxem, 1842, Geol. Rep, 3d Dist. N. Y., p. 57)	..	..	..	*	*	..
Graptolithus serratulus,	Hall, 1847, Pal. N. Y., I, p. 274	..	..	..	*	*	..
Graptolithus sagittarius,	Hisinger, 1837 (*Prionotus sagittarius*) Hall, Pal. N. Y., I, p. 272	..	..	..	..	*	..
Graptolithus subtenuis,	Hall, 1877, Miller's Catalogue Amer. Pal. Fossils,	..	..	..	..	*	..
Monticulopora fibrosa,	Goldfuss 1826, (*Calamopora fibrosa*), Germ. Petref.	*	*	*	*	..	*
Monticulopora lycoperdon,	Say 1847 (*Favosites lycoperdon*) Hall, Pal. N. Y., I, p. 64	*	*	*	*	..	*
Retiograptus eucharis,	Hall, 1865, Can. Organic Remains Decade II, p. 146	..	..	..	*	..	..
Retiograptus Geinitzianus,	Hall, 1859, Pal. N. Y., III, p. 518	..	..	..	..	*	..
Thamanograptus capillaris,	Hall, 1859, Pal. N. Y., III, p. 520	..	..	..	..	*	..
Thamanograptus typus,	" " " " " " 519,	..	..	..	..	*	..
Rastrites Barrandi,	" " " " " " 521,	..	..	..	..	*	..
Stellipora antheloidea,	Hall, 1847, Pal. N. Y., I, p. 79	..	..	*	*	..	*
Ptilodictya acuta,	Hall, 1847, Pal. N. Y., I, p. 74	..	*	*	*	..	*
Sagenella ambigua,	Walcott, 1879, Trans. Albany Inst., X, p. 22	..	.	..	*	..	..
Lingula curta,	Conrad, 1842 (Hall, Pal. N. Y., I, p. 97)	..	..	*	*	..	..
Lingula Daphne,	Billings, 1862, Pal. Fossils, I, p. 50	..	..	..	*	..	..

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Genera and Species.	Authority and Reference.	Chazy.	B. and B. R.	Trenton.	Utica Slate 1.	Utica Slate 2.	Hudson River.
Lingula Progne,	Billings, 1862, Pal. Fossils, I, p. 47	..	..	*	*	..	..
Lingula quadrata,	Eichwald, 1829 (Hall, Pal. N. Y., I, p. 96)	..	..	*	*	..	..
Schizocrania filosa,	Hall, 1847 (*Orbicula ? filosa* Hall), Pal. N. Y., I, p. 99.	..	..	*	*	..	*
Leptobolus insignis,	Hall, 1871, 24th Rep. N. Y., S. Museum, p. 227	..	..	..	*	..	..
Leptobolus occidentalis,	" " " " " " "	..	..	..	*	..	*
Leptæna sericea,	Sowerby, 1839, Murch. Sil. System.	..	.	*	*	..	*
Strophonema alternata,	Conrad, 1838 (*Leptæna alternata*), Ann. Rep. N. Y., p. 115	*	*	*	*	..	*
Orthis testudinaria,	Dalman, 1827 (Hall), Pal. N. Y., I, p. 117	..	..	*	*	..	*
Pentamerous hemiplicatus,	Hall, 1847 (*Atrypa hemiplicatus*), Pal. N. Y., I, p. 144	..	..	*	*	..	..
Rhynchonella capax,	Conrad, 1842 (*Atrypa capax* Conrad), Journ. Acad. Nat. Sci., VII, p. 264 (*Atrypa increbescens* Hall), Pal. N. Y., I, p. 146	..	..	*	*	..	*
Rhynchonella recurvirostra,	Hall, 1847 (*Atrypa recurvirostra*) Hall, Pal. N. Y., I, p. 140	..	*	*	*	..	*
Zygospira modesta,	Say Hall, 1847 (*Atrypa modesta*) Pal. N. Y., I, p. 141	..	..	*	*	..	*
Avicula insueta,	Conrad (Emmons Geol. Rep., 1842, p. 399)	..	.	..	*	..	..
Avicula Trentonensis,	" 1842, Jour. Acad. Nat. S., III, p. 240.	..	..	*	*	..	..
Modiolopsis anodontoides,	Conrad, 1842 (*Cypricardites anodontoides*), Pal. N. Y., I, p. 298	..	..	..	*	..	*
Modiolopsis cancellatus,	Walcott, 1879, Trans. Albany Inst., X, p. 22	..	..	..	*	..	..
Modiolopsis curta,	Hall, Pal. N. Y., I, p. 297	..	.	..	*	..	*
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Ceraurus pleurexanthemus,	Green, 1832, Monograph, p. 84	..	*	*	*	*	*
Calymene callicephala,	Green, 1832, Monograph, p. 30	..	..	*	*	..	*

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Genera and Species.	Authority and References.	Chazy.	B. and B. R.	Trenton.	Utica Slate 1.	Utica Slate 2.	Hudson River.
Proetus parviusculus,	Hall, 1872, 24th Rep. N. Y. S. Museum, p. 223	..	..	*	*	..	*
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Triarthrus Canadensis,	Smith, 1861, Can. Journ., p. 275	..	..	..	*	..	..
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All the species mentioned in the catalogue have either been observed by the writer in the Utica slate formation or incorporated in the catalogue on the authority of the publications of the geological surveys of New York, Canada or Pennsylvania.

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DEGRADED WORDS.

By Gilbert M. Tucker.

[Read before the Albany Institute, May 13, 1879.]

The fundamental principle in philology, that on close examination of any living language, a large proportion of its words will be found undergoing a process of gradual modification in their significance, or at least in the precise sense in which by common consent their originally recognized significance is generally taken — finds abundant exemplification in English; and the changes in the meaning of familiar words, though apparently in many cases anomalous at first sight, may nevertheless be classified and grouped in such manner as to suggest the drawing of certain inferences, and to illustrate, indirectly but effectively, some of the important traits of character that prevail among the people by whom the language is employed. Whether parallel processes of modification can be traced in other tongues — a question full of interest — must be left to the comparative philologist; but it is the purpose of this paper to make a slight contribution to the development of the subject at large — the direct influence of moral character upon language — by sketching, inadequately and summarily only, the salient features of one group of changed meanings in English — the group whose nature keeps a record of the follies, weaknesses and common faults of humankind, and the daily trials and disappointments that flow from them; the alterations in the meanings of words which are plainly due to the unwise or culpable practices of those who use them. Many of the facts referred to for illustration are of course familiar — so familiar indeed that it is rarely possible to give credit to the authors who originally noted them.

I.

To take as the first instance a case where the change is still in progress, there is the adjective *pitiful*, which at present we almost invariably employ in an evil sense. "A pitiful subterfuge," we say; that is, a transparent and contemptible attempt at fraud. Yet the dictionaries with one accord give the good meanings precedence — either "melancholy, moving compassion, deserving to be pitied"

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(exemplified in the watchman's ejaculation, "pitiful sight!" on discovering the dead body of Juliet), or else "full of pity, tender," as in the three instances in which only the word occurs in King James' Bible. Now it needs no conjecture to discover the reason and method of this gradual drifting in meaning from good to bad. Whoever has heard a "pitiful" story of his woes from a wandering solicitor of charity, and, moved with compassion, has looked into the case only to find an impudent attempt at deceit, has the explanation before him in characters which he may run that readeth. The "pitiful" story becomes a provocative of scorn and indignation; and the ignominy of the transaction attaches itself indissolubly to the word that described its first appearance, dragging down with it the innocent adjective, and fitting it for companionship with actions and conditions diametrically opposite to those with which it originally found place.

Yet if misery loves company, there is no lack of consolation for *pitiful*, in this unfortunate relegation to infamous uses. At least three other adjectives have traveled far in the same direction and by much the same route — *apparent, plausible* and *specious*. The first of these commonly, though of course not always, the transformation as yet being incomplete, but commonly, carries with it in these days at least an insinuation that the thing to which it is applied is not really quite what it seems — that we must not be surprised in fact if the truth of the matter turns out to be very different from its *apparent* condition. This insinuation is, so to speak, a fungus of comparatively recent growth upon the real meaning of the word, gradually fostered beyond doubt by a series of painful discoveries. Bailey's whole definition of *apparent*, in 1764, was "that plainly appears, certain, evident, manifest, plain, visible." Thus we still say an "heir apparent," meaning an heir beyond question or dispute, but as far as common usage is concerned, we should hardly employ a word like *certain* as a synonym of *apparent*, the present practice being rather to consider the two adjectives as almost contradictory of each other.

As regards *plausible* and *specious*, they are manifestly only the English forms of the Latin *plausibilis* and *speciosus*,[1] of which the

[1] Of course everybody knows that many words of classical derivation have come into English, not directly, but through living European languages, chiefly the French; but that fact is of no consequence for the present purpose, so long as they have preserved enough of their original form to be recognized as the same.

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first indicated primarily the possession of qualities deserving of applause, as "*plausibilis nomen*" in Cicero; while *speciosus* is commonly best rendered by such expressions as "having a good shape, beautiful, handsome, fine or splendid." Now what a commentary it is upon the proverbial deceitfulness of appearances in this uncertain world, that these terms, which really indicate that a thing seems to be all right, have come to convey so sharply the implication that it is all wrong!

There is a noun too that started earliest of all in the same *descensus Averni*, and has long since reached a point so low that its hereditary claim to respectability has been almost forgotten. This is *hypocrite*, the Greek *hupokritēs* in a modern dress — and *hupokritēs*, as everybody knows, meant originally nothing but a player or actor. Roscius, the elegant speaker and beloved instructor of the greatest Roman orator, was by virtue of his art a *hypocrite*. Plainly the first step downward was taken when the word began to be used figuratively — when men were called hypocrites (in English or Greek) because their life was found to resemble the histrionic art in striving to appear to be different from what it was. It cannot have taken the commonsense of mankind long time to perceive that such dissimulation is almost always for evil purposes — the sheep's raiment covering the ravening wolf. And so it has come to pass that when we wish to indicate the assumption of virtue for the intents of vice, the word that springs most readily to the lips is the once well-thought-of "hypocrite."

To *counterfeit*, likewise, was formerly only to imitate, conveying no insinuation as at present that the imitation was designed to be fraudulently substituted for the original — this added insinuation having been developed by the same process as the present evil significance of the word hypocrite. To *equivocate* was merely to call two things by the same name, not necessarily to mean one while leading the hearer to understand the other. *Tinsel* was really woven of the precious metals, or supposed to be, until the detection of oft-repeated frauds caused it to be taken for granted that the appearance of exceptional richness and value in ornamental trappings of this material is nothing but the appearance, without reality.

Finally under this head should be mentioned the group of words most characteristic in their present meaning of the special vice of deliberate attempt at deception — the verb *pretend* and its derivatives. To say nothing of the innocent meaning indicated by their Latin origin, it is not so very long since they were used in English without

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any evil implication. Ash, 1775, mentions among his definitions of the verb, "to claim, to demand as right," and gives "a claim" as the first equivalent of the noun pretension. Johnson informs us that a pretender is "one who lays claim to anything" — that, and nothing more. A claimant, whether justly or unjustly, was in his view a *pretender*, and the butcher Orton, had he lived in England a century earlier, might have been spoken of as "pretending to be Sir Roger Tichborne" without the slightest intimation on the part of the speaker that the story was not believed. In the third part of King Henry Sixth, published 1623, Shakspeare makes Sir John Montgomery demand of King Edward at the gates of York, "why shall we fight, if you *pretend* no title?" and in the same breath, "if you'll not here proclaim yourself our king, I'll leave you to your fortune" — using *pretend* almost interchangeably with *proclaim*. Milton indeed, forty years later, wrote, "this let him know, lest, wilfully transgressing, he *pretend* surprisal" (*Paradise Lost*, v, 244), and elsewhere uses the word in the same manner; but the innocent meaning has lingered in literature for nearly two centuries longer. As historically applied for instance to the son and grandson of James II. of England, it can hardly have been originally intended to signify much more than *claimant;* for the unfortunate princes made no attempt at representing themselves to be anything but what they were, though they unquestionably *laid claim* to a kingly dignity that the nation was not anxious to concede to them. In the denoument of Lord Lytton's masterpiece, "My Novel," to take an instance within thirty years of the present time, it may be remembered that Peschiera, in his scathing exposure of the villainy of Randal Leslie, speaks of him as "pretending" to the hand of Violante; and though there was certainly no love lost between the two worthies at that juncture, yet the context makes it clearly evident that this particular word is intended in no reproachful sense — the dashing count meant only to represent the minor scoundrel as his rival, seeking what he himself sought, and by much the same means, and *pretend* in his mouth is the exact equivalent of *aspire*. Yet who does not feel, now-a-days, the more than suggestion of a charge of fraud that is conveyed when we speak of and one as "pretending," or as a pretender? — and indeed Webster, reversing the earlier order of definitions, renders the noun as meaning, first, "one who simulates or feigns," and only secondarily, "one who lays claim," in which he doubtless interprets correctly our modern usage. What deduction can we draw from

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such a progression in meaning toward the bad but this — that it has been the common experience that people are apt to claim more than their due — to make demands considerably in excess of the requirements of equity?

There is yet one more word that may perhaps be considered as allied to the foregoing, if the history of its changing sense, as given by Barclay — an author of no great fame, who nevertheless managed to gather a good deal of curious and interesting matter — is true. This is *legend*, of which he says, writing about eighty years ago, that it was originally "a book in the church containing the lessons that were to be read in divine service; from hence the word was applied to the histories of the lives of the saints, because chapters were read out of them at matins, but as the 'golden legend,' compiled by James de Varase about the year 1290, contained several ridiculous and romantic stories, the word is now used to signify any incredible or unauthentic narrative." That is to say, legends, books highly esteemed, have been so often found to contain glaring falsehoods — for it can hardly be that the change is wholly attributable to the single instance mentioned by our author — that the very word which used to denote only that the composition to which it was applied ought to be read, now serves rather to warn the reader that it ought not to be believed!

II.

Another common fault with our not-too-truthful humanity, nearly allied to the practice of exaggerating one's own deserts and concealing blemishes, is that of unduly depreciating the merits of other people, and particularly of despising beyond reason such classes of the community as we thing below us; and this habit, as might be anticipated, has made its mark upon our language. There are numerous words that formerly indicated little more than inferior social or political position, but which have come to embody the charge of something much worse. Thus a *villain* was at first, as Trench puts it, only a serf or bondsman "(*villanus*), because attached to the *villa* or farm;" and secondly "the peasant who, it is taken for granted," [and this is the root of the matter] "will be churlish, selfish, dishonest, and of evil moral conditions, these having come to be assumed as always belonging to him, and to be permanently associated with his name, by those higher classes of society who in the main commanded the springs of language. At the third step, nothing of the meaning which the etymology suggests, nothing of *villa*, survives

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any longer; the peasant is quite dismissed, and the evil moral conditions of him who is called by this name alone remain." Thus Barrow rather superciliously remarks that foul language "is termed villainy, as being proper for rustic boors, who, having their minds debased by being conversant in meanest affairs, do vent their sorry passions in such strains."

The term *boor*, just quoted, was likewise originally descriptive of nothing worse than "a husbandman," "a plowman," "a country fellow," and the world or its Hollandish representative is still applied, without offense, to the wealthy and presumably well mannered Dutch planters of South Africa. A *churl* was a free tenant at will, or, as some trace the derivation, only a person of remarkable physical prowess. A *kern* was a footman or foot-soldier of rural extraction. A *pagan* was "first a villager, then a heathen villager, lastly a heathen." *Heathen* itself meant originally only a dweller on the heath or open country. *Incivility* was merely the customary behavior (in the eyes of city residents), of their somewhat unpolished acquaintances from the interior; and the epithet *savage* indicated for a long time nothing more than relationship to the forest, or at worst a wild or uncultivated state, without the implication of anything like ferocity. This must have been Milton's conception when he wrote of a "savage hill," and a "savage wilderness;" and Dryden's too, who speaks of "savage berries of the wood."

Not only, however, are dwellers in towns addicted to under-estimating their brethren of the fields, but the smaller minds of every country are apt to consider their land the flowery kingdom, and to despise unreasonably the outside nations. The prevalence of this folly is well illustrated by the present degradation of the adjective *outlandish*, which ought of course to mean only foreign, as it plainly did in the seventeenth century, when Translator-General Holland, rendering Pliny into English, made him refer to "outlandish wheat." The *uncouth*, also, was once merely the unknown or unfamiliar; a *vagabond* and a *harlot* was a wanderer or stranger, not necessarily of disreputable character; and a *barbarian*, in Greek, was a man of different nationality from the speaker.

Idiot meant originally in English, as in its native tongue, only a private person, or at worst an unlearned man, these two constituting the whole definition given by Bailey, except when used as a technical term in law. Jeremy Taylor, in the middle of the seventeenth century, remarked that "humility is a duty in great ones as well as in idiots;" and Blount, a contemporary of the good bishop, says:

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"Christ was received of idiots, while he was rejected and persecuted by the priests, doctors and rabbis." From this meaning, however, the word speedily descended to the level of the lowest classes in society; then came to indicate dense and stupid ignorance, and finally attached itself to persons absolutely void of understanding, natural fools, innocent or simpletons, as Webster has it. One can imagine the effect, in these days, of a minister's addressing his congregation as composed in part of idiots!

The appellation *caitiff*, which implies at present, and has done so for a long time, the possession of certain highly uncommendable traits of character, is traced by Johnson to the Italian *cattivo*, a slave, "whence," says the doctor, "it came to signify a bad man, with some implication of meanness," and he adds: "A slave and a scoundrel are signified by the same words in many languages."

The adjective *vulgar*, again, was once almost synonymous with such innocent terms as general, public, and even national. A *mob* was not much more than the common people, the crowd, having only in recent times come to imply, adopting Worcester's expression, "a crowd excited to some violent or unlawful act," the select few always recklessly imputing evil purposes to the many who they think should rank below them. *Base*, *mean* and *lewd* were terms applied of old to the mass of the population, as distinguished from the gentry or clergy, and indicated nothing worse than this. Spenser writes, in the *Faerie Queene:*

> "But virtuous women wisely understand
> That they were born to base humility,
> Unless the Heavens them lift to lawful sovereignty."

In one of Latimer's sermons, we read: "It might please the king to accept into his favor a mean man, of simple degree and birth, not born to any possessions." As for *lewd*, it seems to be only a variation of *lay*, a lewd fellow being etymologically merely a layman. So Chaucer, in the *Canterbury Tales:*

> "For if a priest be foul, on whom we trust,
> No wonder is a lewid man to rust."

But the rich and the learned have been tempted so often to despise and slander the poor and the ignorant, these adjectives have been coupled so commonly with injurious aspersions, that we now insult a man, however humble his station in life, if we call him base, mean or lewd.

A process of degradation, not dissimilar from the foregoing in its operation, has been effected within comparatively recent times also on the noun *beast* and its derivatives, it seeming to have been found

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impossible for rational man to speak of his less highly endowed fellow creatures without some tinge of scorn gradually attaching itself to the name by which he calls them. The "beasts" of the Apocalypse are plainly only living beings different from men; and in Wiclif's version of First Corinthians, five hundred years ago, we find: "It is sown a beastly body; it shall rise a spiritual body."

The term *knave*, like the German *knabe*, meant at first only a boy, well or ill behaved. In Wiclif's Apocalypse, the woman clothed with the sun is represented as giving birth to "a knave child;" and when Shakespeare wrote "good knave" (in the Twelfth Night), and "gentle knave" (in Julius Cæsar), there was nothing incongruous in the expressions. Next it indicated a servant; there is said to be an early version of the New Testament in which the Apostle Paul is styled "the knave of Jesus Christ;" and it is doubtless in the sense of a serving man or attendant to the king and queen that the name was given to the card at whist. Indeed the knave is called "*le valet*" in French to this day — *valet*, by the way, being only the modern form of the old Gallic *varlet*, our English varlet. The words caitiff, knave and varlet came, however to designate not only a servant but a cowardly or roguish servant, and in process of time the original signification has been quite lost sight of, nothing remaining of the poor despised dependents but the evil odor of their supposed bad morals.

A *blackguard*, moreover, was merely a scullion — that is, *the* "black guard" was the company of such servitors, who accompanied persons of quality on their journeys, to take care of the pots and kettles; and the ancient acceptation of the term involved no necessary conception of ruffianly manners.

A menial was one of the household or mesnee; *minion* was only a favorite, the French *mignon*. A *brat* was simple a child, however lovely; and an *imp* was a young person, a minor, particularly, it it would seem, a young heir. To *imp* is to engraft, and the imps of a family were what we now, adopting precisely the same figure, call the scions. Tusser writes, in "Good Husbandry," 1557:

> "Take heed how thou layest the bane for the rats,
> For poisoning thy servant, thyself, and thy brats."

It is stated that one of the earls of Warwick, who died in boyhood, is commemorated in a mortuary inscription in the chancel of the parish church as "the noble imp;" and Bacon, in his "Pathway unto Prayer," exhorts his readers to "pray for the preservation of the king's most excellent majesty, and for the prosperous success

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of his entirely beloved son, Edward our Prince, that most angelic imp."

Now it may, be of course, that a part of the new turpitude which has gradually attached itself to all these words — villain, boor, churl, kern, pagan, savage, vagabond, harlot, barbarian, idiot, caitiff, vulgar, mob, base, mean, lewd, beastly, blackguard, minion, brat, imp, and others like them — is attributable to the actual discovery of unexpected vices in the classes to whom they primarily referred; but it seems more probable that the terms have become odious chiefly because of their constant application to those unfortunates whom their betters have though it proper to regard with some measure of systematic contempt. In either case, the changes in meaning that the whole group have undergone, constitute certainly a very striking instance of the power of degradation which man's bad habits are constantly exerting upon the structure of the language that he uses.

III.

But it must not be supposed, nevertheless, that all the despising, all the calling of hard names, is to be attributed to the upper ten. A moment's reflection will discover that the children, the learners, and inferiors of various grades, have been active, on their part, in bringing about a similar humiliation for the words by which they designate both the persons and the opinions of their rulers and instructors. Here however, as in the preceding case, there has no doubt been fault on both sides. Had the teachers of youth never assumed a degree of knowledge beyond their actual attainments, the words *pedant* and *pedagogue*, both perfectly innocent in their etymology and once inoffensive in their use, might never have come to convey the implication of owlish self-conceit. Had the schoolmen of the middle ages devoted a larger share of their attention to the acquisition of really useful and practical knowledge, and exercised their wits less exclusively with "subtill quiddities," the name of their great exemplar, Duns Scotus, might never have been corrupted, in form and meaning, into our modern *dunce*. Had the expounders of scientific discovery, and the preachers of religion, been invariably careful to confine their inculcations within the limits of certain truth, and to allow to their disciples in some degree the exercise of untrammeled reason in weighing the doctrines they were expected to accept, the term *theory*, which ought to denote a reasonable opinion logically deduced from a sufficient number of established facts, might

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never have sunk so near to becoming a synonym of the wildest guessing; and *dogma*, which properly indicates only a tenet or principle of belief, might never have carried with it the imputation of obstinate and unwarranted assertion. Had students really in possession of superior knowledge employed it more generally for the benefit of their fellow-men, rather than to bewilder and delude them, the term *wizard* (a wise man) might never have descended to equivalency with charlatan and impostor.

Had absolute rulers again, exerted their authority mainly for the good of their subjects, the appellations *tyrant* and *despot* might still have been free from more than shade of censure that now clings to them. *Tyrant*, indeed, began very early to imply reproach, and in Latin is commonly used in the same unfavorable sense as in English, but in Greek we find it applied to the mild Pisistratus. *Despot*, it will be remembered, was frequently employed in antiquity as a respectful form of address in approaching a monarch. Thus in Herodotus' account of the debate in the Persian cabinet over the invasion of Greece, the statesman Mardonius, beginning the speech that "smoothed over" the opinion of Xerxes, calls him "*O despota*" — rather inadequately rendered by Cary, "sir." And in much later times, if the tradition preserved by Döllinger in his "Myths of the Middle Ages" is to be believed, the announcement, "*Arrēn hēmin estin ho despotēs*," constituted an essential formality in the enthronement of the popes. In no such case as this, can the Greek progenitor of our English *despot* be supposed to convey any uncomplimentary notion. The modern conception of selfish and cruel oppression that is now so firmly united with the definition of either of these words, is doubtless the outgrowth at once of the bad use of unlimited authority on the part of the average ruler, and of the proneness of the average subject to cast what opprobrium he can and dares upon the powers that be.

IV.

Turning now to words relating to the passions and appetites, we shall find several whose altered meanings tell plainly the story of repeated indulgence in wrong directions, or at least of groveling tastes. The degradation of the word *paramour*, formerly used by Spenser and others in a perfectly innocent sense, and the vulgar misuse sometimes to be noticed of the beautiful word *love*, which ought to express one's feelings toward his child, his wife, his mother or his God — the misuse of this word by connecting it with the names

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of things we eat — are cases in point. To *carouse*, again, was once only to drink, with however great a degree of decorum and propriety. "The queen carouses to thy fortune, Hamlet," so proclaims that august lady in the last scene of the tragedy, referring plainly to the taking of a single glass, by way of formal compliment. But as our affections are so apt to be set upon things that perish with the using, and as the enjoyment of intoxicants has been found so often to degenerate into their lawless and injurious abuse, we have come by degrees to conceive the preposterous notion of "loving" a favorite eatable, and our designation of the slightest possible use of wine has grown so swollen and distorted, like the persons of the depraved beings whose bad habits have brought about the change, as to imply the highest degree of riotous excess.

The selfish and malevolent passions, too, have been at work upon our vocabulary. Charles Francis Adams, some years ago, took occasion to characterize the British nation as greatly "*addicted* to commerce," for which expression he was censured by sundry newspapers, on the ground that commerce is not a vice. Truly it is not; but why should we never speak of persons or peoples as *addicted* (or *prone*, which is another expression of exactly the same kind) to anything but what is evil? — the words having equally proper application, both by etymology and by the authority of ancient usage, to good practices and to bad. Why, indeed, had not common experience persistently given its testimony in support of something very like the much abused theological doctrine of total depravity, the doctrine that "we are utterly indisposed to all good, and wholly inclined to all evil?"

Indolence, again, once signified merely a condition of freedom from pain or excitement, and it would seem that its present parity with laziness must be due to the fact that humankind is not likely greatly to exert itself unless stimulated by the actual presence or the apprehended peril of some sort of discomfort. To be *careless*, in Pope's time, was to be free from anxiety, not culpably negligent, as now. "Thus wisely careless, innocently gay," he writes. In its present common language, we seldom consider carelessness wise. *Indifference* was impartiality, so that it was once a compliment to say of a magistrate that he administered justice indifferently, though we should now infer from the remark that his decisions were thoughtless and as likely to be wrong as right.

To *covet* means, of course, properly speaking, only to desire

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eagerly, the French *convoiter*, and the expression was formerly employed, as by the translators of the Bible in First Corinthians (xii, 31), "covet earnestly the best things" — without that implication of evil which man's bad habit, his proneness to covet more particularly what he knows he ought not to have, has fastened upon it.

The expression "to *inflame*," which we seldom hear now-a-days except in connection with some evil feeling, was used of old in reference to the good passions quite as freely as the bad, examples of which practice can be found in many hymns still sung. "To *denounce*," also, "to *instigate*," "to *conspire*," and "to *provoke*," are verbs that we hardly ever employ at the present day except in reference to wrong doing, though just as correctly applicable to endeavors in the most praiseworthy directions, and once so used.

Animosity, in Sir Thomas Browne's "Urn Burial," 1658, meant courage, as where he tells us that Cato confirmed "his wavering hand to animosity" by reading the Greek philosophers. "To *have words*" with a man, is now in most cases to quarrel with him, so great is the tendency of animated discussions, those in which we notice chiefly the great flow of words on both sides, to degenerate into heated disputes.

But perhaps the most striking instance of the spoiling of words of this class is that which is furnished by the verbs *retaliate*, *resent*, and their derivatives. The writer was once present at the parting of that scholarly but somewhat eccentric divine, the Rev. Dr. Samuel Hanson Cox, from a gentleman to whom he was indebted for hospitality, and to whom he said: "You may be certain, sir, that I shall be glad of any opportunity to display my resentment of your attentions." The host looked rather blank, as well he might, and the doctor explained: "That word resentment, sir, is a good word that has been brought into disgrace by man's wickedness. It only indicates a feeling-back, a desire to reciprocate, and was once employed as well in relation to benefits as to injuries. But we have so short a memory for kindness, and so vague an intention of returning it, while our perceptions of wrong done us are so acute, and our inclination toward revengeful purposes so strong, that one is actually not understood in these days if he speaks of resenting anything but an affront or an attack!" This position is unquestionably sound; and almost the same remarks apply also to the companion words *retaliation* and *retaliate*, which certainly no one would think of employing now except in connection with some kind of injury. Yet to retaliate

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is really of course only to pay back, whether good or evil, as to resent is to feel back, whether with gratitude or with anger; and examples of the use of both words in the good sense abound in our earlier literature, particularly in the sermons of the seventeenth century, with whose authors they seem to have been favorite terms. Thus Isaac Barrow strongly enjoins the duty of cultivating "resentment of our obligations to God," and in another passage remarks that "honor renders a man a faithful resenter of courtesies;" and Edmund Calamy says: "God takes what is done to others as done to himself, and by promise obliges himself to full retaliation." Dryden, too, writing at about the same period, has the statement: "The king expects a return from them, that the kindness which he has shown them may be retaliated on those of his own persuasion." Such expressions grate harshly upon modern ears, but that is because the words have become soiled and polluted by the unworthy purposes to which they have now so long been generally restricted. And the language, let it be noticed, is just so much the poorer in consequence, for we have no exact synonyms with which, for their former and better use, we may replace them.

V.

Another unfortunate trait of character whose prevalence is curiously illustrated in a similar way, is that suggested by the adjectives *meddlesome* and *officious*. To meddle with anything was once merely to concern one's self with it, no implication of any impertinence or other impropriety being conveyed. *Officious*, in Bailey's time, had preserved exactly the meaning of its Latin ancestor, "ready to do one a good office, serviceable, very obliging," and it is in this sense that Titus Andronicus uses it when he says [v, 2]: "Come, come, be every one officious to make this banquet." *Pragmatical* and *busybody* also, though perhaps always involving some degree of censure in their English use, *ought* certainly by every principle of etymology to be susceptible of an innocent if not a laudatory application. *Pragmatikos* means "active, able, business-like or prudent." A busybody is plainly a person who is busy; and why, in either case, should it always be taken for granted that the individual of whom these terms are predicated is active about business that he might better let alone, unless the common experience of those who have employed the words has taught them that people are for the most part rather more likely to exert themselves in the pursuit of

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uncommendable enterprises than in the practice of their appropriate occupations?

VI.

Our evil tendency to grumble and complain of our surroundings, and to find fault with our fellow-man, has likewise been instrumental in the degradation of a number of common expressions. Can it be believed, for instance, that *homely* would ever have come to mean ugly among people cultivating a due spirit of contentment with their daily lot? The adjectives *chronic* and *inveterate*, also, and the nouns *plight* and *predicament* ought to be as freely applicable to desirable states and conditions as to the reverse. Dr. Cuyler wrote, not long ago, in the *Evangelist:* "We pastors set great store by chronic Christians;" but in present common usage it cannot be denied that these terms are seldom heard except in relation to things evil. A *catastrophe*, too, is really only the final act of a drama, whether tragic or comic, and has perhaps become so nearly the synonym of disaster chiefly because we are so apt to take it for granted, in our talk, if not in our real convictions, that things generally do turn out badly.

"To *censure*" was once merely to express an opinion, as in Richard III.: "Will you go and give your censures in this business?" But our judgment of each other is so often uncharitably severe that the meaning has become limited to unfavorable judgment only; and it appears to me that *criticise* is going the same way — we apply it much more frequently, I think, to the expression of blame than of commendation.

The *epithet egregious* might formerly have been coupled with the name of the most distinguished philosopher, poet or statesman; but we are so much readier at abusing our neighbors than praising them, that the term *epithet* has dropped almost entirely its good use; and we are so likely, in characterizing any person as at all peculiar, which is all that egregious really signifies, to mean that he is peculiarily disagreeable, that one rather expects now-a-days some highly damaging appellation to follow, when a man is mentioned as "an egregious —" and there the speaker pauses.

VII.

Man's propensity to over-reach his fellows when he can, and to take unfair advantage of their necessities, has branded several words with new opprobrium. To *prevent* is really only to get ahead of, or

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to precede, as in the English Common Prayer: "Let thy grace always prevent and follow us;" and Hamlet (ii, 2), "so shall my anticipation prevent your discovery." But alas, those who reach first a desirable goal are so wont to take advantage of their position, not to help others get there too, but to block the way if possible, that the verb which ought only to describe the arrival of the first-comers in advance of the rest, is now understood as implying also their doing the best they can to monopolize the good fortune, and *prevent* others from sharing it.

Another illustration of the same principle, still stronger perhaps, is furnished by the word *rival.* Rivals were at first only the occupiers of the banks of the same stream, and a little later, partners or co-laborers in the same enterprise. It is in this sense that Bernardo speaks of Horatio and Marcellus as the rivals of his watch. But it came to be perceived that joint owners and partners are very apt to quarrel, each doing his best to possess himself of all the advantages of the combination, until at last the word, in our present usage, has come to involve the entirely modern addition of a conflict of interest, and more or less hard-feeling between the parties.

Artful, so late as the time of Johnson, meant only skillful, not tricky. *Usury* was once merely interest money, however moderate the amount and however legal and equitable the charge. A *cheat,* or escheatour, was a royal officer in England who attended to the sequestration of estates that were forfeited to the crown, and the corrupt practices of these men led it to be commonly believed that to "cheat" a man was to deprive him of his property *unfairly* — which meaning is now the only one recognized. To *embezzle* was to spend rashly and foolishly, but it was applied for a long time to the man's own property — "Mr. Hackluit died, leaving a fair estate to an unthrift son, who embezzled it" [1] — that is, wasted it — until it was discovered that spendthrifts are apt to become thieves as well. A *defalcation* was formerly only a diminution or abatement, as in Burke: "The natural method in reformation would be to take the estimates and show what may be safely defalcated from them." Its present use, as implying arrant knavery in the diminution, is possibly due in part to some supposed connection with "default" and "defaulter," to which words, of course, it is by etymology only very distantly if at all related.

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[1] Thomas Fuller, "*Worthies of England,*" 1662.

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VIII.

Of the great multitude of other degraded words that do not so readily fall into classes, but illustrate nevertheless each one the prevalence of some blameworthy course of action or thought, there may be instanced *gossip*, which denoted first a fellow sponsor in baptism, next an intimate friend, and finally a too-talkative and therefore often dangerous companion; *voluble*, which was only fluent (and not unduly fluent as at present) when Bishop Hacket, a little more than two hundred years ago, wrote of Archbishop Abbott that "he was of a grave and voluble eloquence;" *conceit*, properly the equivalent of *idea* or *opinion*, but rarely used now except for such opinions as the speaker deems ill-founded or absurd; *profane*, which originally meant only secular or non-sacred, as we still say "profane history," and its opposite, *fanatic*, which really signifies about the same as *inspired; libertine* and *miscreant*, formerly synonymous with free-thinker and infidel, and having reference solely to the man's opinions instead of his actions; *obsequious*, which once implied merely the exercise of affectionate and becoming obedience; *fussy*, which was once the same as *busy;* an *apology*, which was of old only a defence, by no means implying that the thing apologized for was in the slightest degree admitted to be improper, but only that it had been attacked; *ringleader* and *notorious*, which have only in modern times become restricted to their present evil sense; *bush-whacking*, which was originally "a harmless word, denoting simply the process of propelling a boat by pulling the bushes, or of beating them down in order to open a way through a thicket;" [1] a *proser*, which term really indicates only a person who writes prose, whether tiresome or quite the reverse; *casuistry*, the science of determining what is duty, but more generally applied to specious attempts at making the worse appear the better reason; the adjective *jesuitical*, and the verb *to jew*, which are certainly often used, though perhaps improperly, in a highly offensive sense not at all implied by their original applications.

IX.

Not to prolong, however, this somewhat humiliating though perhaps salutary catalogue of human frailties, there is one bad habit

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[1] Schele de Vere, "Americanisms," p. 89.

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that gives constant annoyance in our daily life, and seems sometimes to prepare the way for all the others — the habit of procrastination, unnecessary and vexatious delay when action is demanded. A vice so common could hardly fail to make its impression on the language. Accordingly we find that certain adverbs of time which are and have been very frequently employed in promising immediate attention to duty, have lost by degrees a large share of their former intensity (promises of this kind being so often broken), and have become so weakened and enervated as quite to obscure the sense in many passages of the older writers. Thus Bailey's definition of the word *presently* — which is "at present, at this time, now," as exemplified by Cardinal Beaufort in King Henry Sixth [part two, 1, 1], "this weighty business will not brook delay; I'll to the Duke of Suffolk presently" — this definition is marked "obsolete" by Webster, though that meaning still seems to survive to some extent in England, for I read the other day in the Newcastle Courant that "General Ramsay is presently visiting at the castle." Yet the American Lexicographer is indisputably correct when he proceeds to mention, as the synonyms of this adverb in its more common applications, the words "soon, before long, after a little time" — which embody quite a different conception.

As regards the similar term *by-and-by*, the case is if possible still stronger, the ancient meaning still more debilitated in its modern usage. Of course this word in our present understanding of it, invariably implies considerable delay, but we need only turn to the Greek testament to discover that King James' translators considered it the equivalent for the most emphatic adverbs that the original tongue can furnish to indicate instant and hurried action — *euthus, eutheos and exautēs.* These words mean suddenly, hastily, rashly, at the very point of time; and are rendered "straightway," "immediately" and "forthwith" in the Bible itself, when *by-and-by* is not used. In the account given by Ulysses in the Ajax of his breathless and frantic pursuit of the mad warrior who had butchered the flocks and their guardians, Sophocles makes him say: "And to me a watchman that espied him bounding over the plains alone, with freshly reeking sword, tells it; and *eutheos* [that is, *instantly*] I hurry close on his steps." Fancy rendering this, as is done with the same word in the Bible, "*by-and-by* I hurry on his steps!" How completely such a translation destroys the coherence of the narrative! What a flood of light is thrown too upon the real intent of the sacred writers, when we substitute the stronger and now more accurate ex-

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pressions for the indefinite by-and-by, as in Matthew xiii, 26: "Yet hath he not root in himself, for when tribulation or persecution ariseth because of the word," not "*by-and-by*," but INSTANTLY "he is offended," does not hold out at all — makes no effort for a single moment to breast the current! Again, Mark vi., 25: "And she came in straightway with haste unto the king, and asked, saying, I will that thou give me," not "*by-and-by*," but AS SOON AS POSSIBLE "in a charger, the head of John the Baptist." Finally, Luke xxi, 9: "But when ye shall hear of wars and commotions, be not terrified, for these things must first come to pass, but the end is not" — *immediately*. And if the gradual fading out of the original intense emphasis of these words is largely due, as every consideration seems to render probable, to the fact that people have so often said they would do things "presently" or "by-and-by," and then have neglected them, so that in process of time the idea of more or less delay has become thoroughly involved in the common understanding of the words themselves — what a commentary does it furnish upon the prevalence of this habit of procrastination, that these terms, once the strongest that could be found to picture hurried and impatient action, have come at last, as indisputably in ordinary usage they have, to denote so vaguely an indefinite period, at an indefinite distance, in the indefinite and uncertain future!

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DESCRIPTIONS OF NEW SPECIES OF FOSSILS FROM THE NIAGARA FORMATION AT WALDRON, INDIANA.

By James Hall.

[Read before the Albany Institute, March 18, 1879.]

In the 4th volume of the *Transactions of the Albany Institute*, I have described a considerable number of new forms from the above named locality of the Niagara group, and also noticed the occurrence of other known species in the same association. The Corals and Bryozoa which, without a critical examination, I then estimated as "at least twelve species," have been subsequently illustrated in the 28th *Report of the New York State Museum of Natural History*, and these together with other new or before unrecognized forms amount to more than forty species. The entire number of species now known to me from this locality is upwards of 150, including varieties.

In the autumn of 1877, Mr. Charles D. Walcott with the aid of Mr. C. Vandeloo made large collections of fossils from the Waldron locality, which have furnished the following new forms, together with an additional number of known Niagara species, not before recognized at that place.

In the preparation of this paper I have been very ably assisted by Mr. George B. Simpson who has carefully studied the Bryozoa and separated the species here described from the previously illustrated forms (in the 28th Museum Report) indicating their distinctive characters. Mr. C. E. Beecher has likewise selected and arranged the remaining species of the entire collection, enabling me to add several new species of crinoidea and other fossils.

PROTOZOA.

Receptaculites sacculus *n. sp.*

Body longitudinally subcylindrical, hollow, open at one end (the base ?), length less than twice the diameter. Cells irregular in size and arrangement, somewhat smaller near the base, expanding at the aperture to twice the diameter below. Distance between the

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cell-apertures equal to the diameter of the apertures. Length of cylinder 80 mm., diameter at the base 55 mm., diameter at the summit about 45 mm.; length of cell tubes in the thickest portion of the cylinder 10 mm.

This species is described from a portion of an individual broken longitudinally through the middle. The fragment is covered with bryozoa rendering some of the characters obscure. It is readily distinguished by its sac-like form from all other species known in this horizon.

HYDROZOA.

Dendrograptus (s.g. Chaunograptus) novellus *n. sp.*

Fossil occurring free in the shales, or upon other fossil bodies, in slender branching fronds. Branches diverging, lax and slender, with numerous branchlets, both marked by numerous cellules which are usually indicated by the appearance of abrupt expansion and contraction of the branches.

The angular projection of the cell-aperture can be observed in many parts of the fossil.

This species is more lax and diffuse than any form of Dendrograptus known to me, and I therefore suggest a separation from the typical forms of the genus. It occurs free among other fossils, or attached to some fragmentary portions of other bodies. In its habit of growth it is quite distinct from any of the forms heretofore illustrated or that have come under my observation.

Inocaulus divaricatus *n. sp.*

Frond ramose, regularly branching about every 10 mm. by dichotomous division. Branches straight, diameter 2 mm., diverging at an angle of nearly 85°, giving the frond a somewhat rigid appearance. Exterior structure composed of numerous irregular, longitudinally striated, branching filaments, connected by slender dissepiments, forming rows of small, irregular, subangular cell-apertures.

This species is distinguished from *I. plumulosus* Hall (*Pal. N. Y.*, vol. ii, p. 176), by its rigid, slender, diverging branches, and by the absence of the projecting, imbricating scales forming the cell-margins.

The specimen here described furnishes some additional evidence regarding the intimate structure and nature of Inocaulus.

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CORALS AND BRYOZOA.

CLADOPORA SARMENTOSA *n. sp.*

Frond ramose, solid, frequently branching, diameter from two to four mm.; cell-tubes radiating equally on all sides from the axis at an angle of 45°, gradually enlarging towards their apertures, which are about .75mm. in diameter, and closely arranged in alternating series, the apertures having their lower side margined by a projecting lip which gradually slopes into the substance of the branch below.

This species bears some resemblance to *C. seriata*, HALL, of the Niagara group of New York, but differs from that species in its stronger and more frequent branches enlarging at their bases; and in the gradual diverging of the cell-tubes from the axis.

TREMATOPORA (CHÆTETES) CREBRIPORA *n. sp.*

Frond ramose, branches infrequent, moderately diverging; substance solid from the filling of numerous small subcylindrical cells, which, originating at or near the centre, gradually diverge to near the surface, where they turn directly outward. Cell-apertures oval, from one and a half to two mm. in length and about two-thirds as wide as long; irregularly arranged, often contiguous, but preserving the oval form. Septa few or none.

It differs from *T. varia* in its larger and distinctly oval cell apertures, and its solid branches.

CALLOPORA ELEGANTULA.

Callopora elegantula HALL. Pal. N. Y., vol. ii, p. 144, pl. 40, figs. 1, 2. 1852.

This species has not heretofore been recognized among the collections from Waldron; but the specimens under examination possess all the essential characters of those from the Niagara group of New York.

CALLOPORA CERVICORNIS *n. sp.*

Frond ramose, branches round or flattened, solid, irregular in their mode of growth, diverging at an angle of 90°, diameter of branches reaching eight mm. Cellules rising from the centre and gradually ascending to near the surface, where they turn abruptly outward; cell-walls very thin; septa very infrequent; cell-apertures oval, .3mm. long, .2mm. wide, closely arranged, with elevated margins which are often granulose. Intercellular spaces very narrow or sometimes wanting, leaving the cell-margins in contact.

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CALLOPORA? DIVERSA *n. sp.*

Frond ramose, solid; branches infrequent, strong and usually somewhat compressed, often much thickened below the bifurcations, and presenting a clavate form. A longitudinal section shows the cells gradually divergent from the centre and turning abruptly outward near the surface; cell-walls with strong and regular corrugations, about four in the space of one millemetre; septa wanting or very infrequent; cell-apertures usually subcircular, sometimes distinctly oval and often subangular from close proximity, with distinct spines at the angles, and sometimes with margins entirely granulose. Intercellular spaces sometimes marked by a single series of pits upon the surface, but usually this feature is absent or obsolete; a section of a branch shows the septate intercellular spaces extending a short distance below the surface.

This species, in its solid structure, and its intercellular spaces, seen only near the surface, so closely resembles CHÆTETES that there is little reason for separating it from that genus. It can be distinguished from *Callopora cervicornis* by its stronger habit, more circular cell-apertures, and conspicuous maculæ with larger cells.

TREMATOPORA SUBIMBRICATA *n. sp.*

Bryozoum ramose; branches straight, hollow; inner surface transversely wrinkled; cellules rising from the epitheca and continuing with slight obliquity to near the surface, where they curve outward almost rectangularly to the axis. Cell-apertures oval, about two-thirds as wide as long, often closely arranged or crowded, upper side without elevated margin, lower side with a projecting lip. In some parts of the surface there are maculæ of larger and more irregularly disposed cells.

This species resembles *T. osculum* in its general aspect; but the branches are stronger, and the cell-apertures irregularly disposed. In that species the smaller and more regularly arranged cells are marked by a projecting border on the upper margin.

TREMATOPORA? (TRACHYPORA?) MACROPORA *n. sp.*

Bryozoum branching; branches slender, solid, infrequent, diameter .5mm Cell-apertures oval, very large in comparison with the branches, about .3mm. in length and .2mm. in width, with

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elevated and granulose margins; the apertures arranged in spira rows, the distance between them a little more than their length Interspaces covered with fine granules.

This species is distinguished from *T. minuta* by the absence of the strong longitudinal rows of nodes, which in that species are more elevated than the cell-margins, while in this the character is reversed. The minute granulæ upon the surface show that the differences observed are not due to weathering or maceration.

STICTOPORA ORBIPORA *n. sp.*

Bryozoum ramose; bifurcations frequent, branches convex, thickness about half as great as the width; margins of branches destitute of cellules, and marked by granulose striæ. Cellules rising from a thin diaphragm and ascending at an angle of about 45° for half their length and then turning slightly backward, open upon the surface in small circular apertures which are surrounded by an elevated granulose margin: cellules arranged in oblique lines in which there are sixteen cell-apertures in the space of five millimetres.

This species differs from *S. similis* in the thicker stipe and the distinctly circular cell-apertures.

CERAMOPORA? (LICHENALIA?) EXPLANATA *n. sp.*

Bryozoum consisting of thin foliate expansions, which may be free or incrusting, and celluliferous on one or both sides: when celluliferous on one side only, the lower side consists of a concentrically wrinkled epitheca; and when celluliferous on both sides, this epitheca becomes a thin diaphragm separating the two ranges of cells. Cellules obliquely ascending and rapidly expanding towards the aperture; arranged in alternating and imbricating series; apertures oblique to the surface of the frond, opening in an arched or subtriangular form.

This species occurs in moderately large expansions, presenting the general aspect of *Lichenalia concentrica;* but it may readily be distinguished by the angular form of the cell-apertures, and by the direction of the cells being more nearly parallel to the epitheca or diaphragm; and they are exposed for nearly their whole length.

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CERAMOPORA RARIPORA *n. sp.*

Bryozoum growing in thin expansions; celluliferous on one side (so far as observed), the other side marked by a wrinkled epitheca. Cell-tubes subcylindrical, oblique, enlarging to the aperture, extremely variable in size. Apertures from .5 to 1.5mm. in diameter; arching and subtriangular in form, and arranged in alternating and imbricating series; the larger cells frequently appearing polygonal and opening directly upward.

This species differs from the preceding in the closer arrangement of the cells, comparatively little of the cell-tube being seen, and also in the larger cell-apertures, which open directly outward.

CERAMOPORA (PALESCHARA?) NOTHUS *n. sp.*

Bryozoum growing in thin expansions, attached to other organic bodies; cell-tubes short, arranged in alternating and imbricating order: aperture arched or angular, usually oblique to the plane of the surface, sometimes opening obliquely upward, one-third of a millimetre in diameter. Surface marked by numerous slightly elevated maculæ, the centres of which are distant from each other about four or five mm. These maculæ are occupied by larger cells, their apertures being nearly a half millimetre in diameter.

In well-preserved specimens, the angles of the cell-apertures have short, spine-like projections.

This species resembles *C. confluens;* but the cell-apertures are larger, and the maculæ are less elevated and always covered by cells. In *C. agellus* the cell-tubes are more exposed and have a radiating order not observed in this form.

ESCHAROPORA (PTILODYCTIA) ANGUSTA *n. sp.*

Bryozoum an elongate, simple stipe, celluliferous on both sides: cell-apertures opening a little obliquely upon the surface, about five in the width of the stipe, occupying a width of 1.3mm., while in the same space longitudinally there are three. Margins of stipe granulose.

FENESTELLA PERTENUIS *n. sp.*

Frond flabelliform, branches slender, from eight to eleven in the space of five mm.; on the non-poriferous side the branches are flattened and striated, the striæ distinct, from three to five on a

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branch, and on well-preserved specimens finely granulose : dissepiments extremely slender, frequently oblique, and not expanding at their junction with the branches. Fenestrules quadrangular, varying from equal to twice the width of the branches, length from two to three times the width. Cell-pores in two ranges, apertures circular, four in the length of a fenestrule, opening obliquely upward : distance between the cell-apertures equal to, or a little less than, their diameter : margins slightly elevated. Centre of the branch longitudinally carinated ; carina sharp and slightly elevated.

FENESTELLA BELLASTRIATA *n. sp.*

Frond funnel-shaped, branches strong, rigid, very gradually enlarging to the bifurcation. Surface of non-poriferous side flattened, strongly striated, striæ two to three upon each branch except just below the bifurcation where the number is greater : dissepiments from one-half to two-thirds the width of the branches, expanded at their junction, about six in the space of five mm. Fenestrules elongate-oval, width about equal to that of the branches, length two or three times the width : cell-pores in two ranges, three in the length of each fenestrule, opening laterally, and slightly upward ; margins elevated and indenting the border of the fenestrule. Centre of the branch carinated, carina narrow and little elevated.

This species differs from *F. pertenuis*, in its stronger branches and much wider dissepiments, which are expanded at their junction with the branches, in the elongate-oval fenestrules, the strong sharp striæon the non-poriferous side, and in the number of pores in the length of a fenestrule.

FENESTELLA CONFERTA *n. sp.*

Frond flabelliform, branches slender, about seven in the space of five mm.; non-poriferous side rounded, striated; striæ granulose, four or five on the width of the branch ; bifurcations very frequent and irregular : dissepiments, from one-third to one-half the width of the branches, widening at their junction, usually direct but sometimes oblique, three in the space of five mm. Fenestrules subquadrangular, varying from equal to nearly double the width of the branches, length about three times the width. Cell-pores in from two to four ranges, usually three ranges ; six to seven in the space of each fenestrule.

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Where there are three or four ranges of cell-pores, the central range, or ranges open directly upward, with the lateral ones opening nearly directly outward ; where there are but two ranges they open directly outward. Cell-apertures small, circular, closely arranged and nearly contiguous ; cell-margins but slightly elevated ; margins and intermediate spaces finely granulose. Ranges of pores separated by a narrow nodose ridge.

FENESTELLA TANTULUS *n. sp.*

Frond flabelliform, branches straight, seven in the space of five mm. ; on the non-poriferous side rounded and striated ; striæ fine, four to six on each branch, strongly granulose : dissepiments from one-half to two-thirds as wide as the branches, expanding at their junction, four in the space of five mm. Fenestrules elongate-oval or subquadrangular ; width about the same as the branches, length from two to three times the width. Cell-pores in from two to four ranges, two ranges predominating ; five pores in the length of a fenestrule ; where there are more than two ranges the inner ones open directly upward and the lateral ones directly outward. Cell-apertures small, circular, margins slightly elevated, spaces between the ranges of apertures tortuously striated ; where there are but two ranges of cells they open directly outward ; the interspaces are elevated and nodose, but not carinated.

This may be distinguished from *F. conferta* by its smaller and more distant cell-apertures, and fewer cells in the space of a fenestrule, and by its stronger and more closely arranged dissepiments.

FENESTELLA PROLIXA *n. sp.*

Frond flabelliform, branches slender, irregular near the base, becoming more regular and straighter above, eight or nine in the space of five mm. ; non-poriferous side rounded and striated ; striæ sharp and in well-preserved specimens granulose, three or four upon each branch. Dissepiments very slender, occasionally oblique to the branch, slightly expanding at their junction, distant from each other about one millimetre. Fenestrules quadrangular, often twice the width of the branch, the length from two to two and a half times the width. Cell-pores in two ranges, four or five in the length of a fenestrule, opening nearly directly upward, apertures circular, margins distinctly elevated, granulose and indenting the border of the fenestrule ; centre of the branch carinated, carina sharp and strongly elevated.

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CRINOIDEA.

Platycrinus siluricus *n. sp.*

The base of the calyx composed of large plates, which have a length of eleven mm. with a width of ten mm. The plates nearly flat in the middle, becoming convex towards the margins, and abruptly depressed at the suture line. Surface granulose, the granules elongate, tortuous and confluent.

Dendrocrinus ancilla *n. sp.*

Body narrowly turbinate, width and height about as ten to twelve or as ten to thirteen; contracted between the arm-bases; upper part of the column closely adhering to the body, the five minute basal plates scarcely distinguishable from the segments of the column at its summit: subradial plates obscurely angular on the lower face, about three-fourths as wide as long, very gradually expanding in width from the base, and supporting on their upper adjacent sloping faces a large hexagonal interradial plate, and this supporting a single radial, from which the arms take their origin. Arms unknown.

This species is narrower and less robust than *D. longidactylus* (*Pal. N. Y.*, vol. ii. p. 193, plates 42 and 43).

Lampterocrinus parvus *n. sp.*

Body small, somewhat narrowly turbinate, obtuse at the base and obscurely pentagonal. Basal plates five, small; the subradials larger: radial plates comparatively larger and strong, the third one not determined: the first interradial nearly equal in size to the first radial; apparently two smaller plates above. Arm-bases prominent, giving a distinct pentalobate aspect to the body; the anal side extremely prominent.

This species has the essential structure and general aspect of *L. Tennesseënsis*, except that there are fewer plates in the interradial series, and the third radial plate is obscure. The specimen is much smaller than any of the Tennessee specimens which have come under my observation, having a height of only about ten millimetres.

This species is from the limestone beds at Waldron, Ind.

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CYATHOCRINUS (POTERIOCRINUS) ÆMULUS *n. sp.*

Body pentangularly subturbinate, rapidly attenuate below the summit of the subradial plates, and expanded above ; the anal side prominent. Basal plates with a prominent node at the base of each one : subradials higher than wide : radial plates wide, pentagonal, with the upper side deeply cicatrised for the arm attachment. First anal plate quadrangular, the second one large unequally pentagonal, and cicatrised on the upper side as in the radial plate. Surface granulose. Arms and column unknown.

This species differs from *C. Polyxo* of the same formation and locality, in its more elongate form and less robust character.

POTERIOCRINUS ? CALYX *n. sp.*

Calyx turbinate. Basal plates strong, thickened at their lower margins, forming a distinct annulation at the base, and having a height a little less than half the height of the subradial plates : subradial plates elongate, three of them hexagonal, the anal side being unknown. Surface of the plates granulose.

The only specimen examined is imperfect and its full characters are unknown. The strong basal plates with the annulated lower margin, and the unusually elongate subradial plates are distinguishing features of the species, and present characteristic differences from any other species known in the formation.

EUCALYPTOCRINUS CONSTRICTUS *n. sp.*

Body subturbinate, narrow below and abruptly expanding from the second radial plates ; becoming ventricose and pentalobate above. Basal plates large, their entire characters undetermined. First radial plates wider than high, the lateral margins scarcely expanding, little incurved; indented on the lower margins for the reception of the basal plates, gently concave on the upper margin, the upper lateral angles truncated for the support of a large interradial plate with narrow base, the surface of which is moderately concave. The second and third radials are quadrangular and pentagonal ; the summit of the latter reaching to the point of greatest gibbosity in the calyx, and supporting on the sloping sides the supraradial plates, being scarcely truncated at the upper extremity for the reception of

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the interbrachial plate. The double second interradial plate, surmounting the first interradial plate is distinctly concave, causing the lobed character of the upper part of the calyx. The lower plates of the arms, only, are preserved.

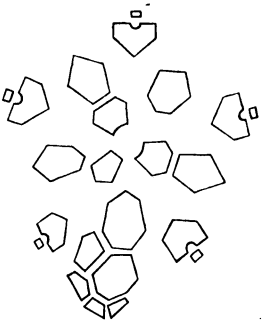
Surface of the plates smooth or finely granulose.

This species is conspicuously distinct from all others, in the contracted lower part of the calyx and the abrupt expansion, giving great gibbosity above, while it is contracted between the arms of each ray by the concavity of the double interradial plates.

AMPHERISTOCRINUS *nov. gen.*

Body turbinate, composed of the following series of plates: basal plates three; subradials five; radials five in the first series, anal area composed of several plates; arms unknown.

This crinoid has the general form and aspect of POTERIOCRINUS or CYATHOCRINUS, and has a similar structure above the basal series. Three individuals have been examined, each one of which has the remarkable protuberant attenuate base and large anal area.



The accompanying diagram gives an illustration of the structure of the Genus.

AMPHERISTOCRINUS TYPUS *n. sp.*

Body somewhat angularly turbinate, base a little protuberant for the column attachment, narrow and distinctly pentangular above to the middle of the subradial plates; the areas formed by the lateral

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portions of the adjacent subradials, the basal portion of the radials and upper part of the basal plates, are distinctly flattened or sometimes slightly concave; and in like manner the areas formed by the lateral portions of adjacent radial plates and the upper part of the subradial are distinctly flattened. The pentagonal basal plate higher than wide, the other two wider than high. Subradials with the pentagonal forms a little higher than wide and the others about equal in height and width. Radials fully one-third wider than high, with a narrow cicatrix upon the upper margin for the attachment of the brachial plate, which occupies scarcely one-third of the width of the plate below. First arm plate quadrangular, above which their character is unknown. Surface finely granulose. Column and arms unknown. Height of calyx 12 mm.

This species in its external form bears much resemblance to *Cyathocrinus Polyxo*, but it is less robust, more slender and more distinctly pentangular in the lower part, while the column attachment is proportionally smaller. Compared with the young of that species the basal plates are distinctly higher, and the same is true of the subradials; but a marked difference in the structure is shown in the number and form of the basal plates,— *C. Polyxo* having five short broad plates, while this species has three basals, two of these hexagonal and about as high as wide, and one pentagonal plate on the anal side which is much higher than wide.

Codaster (Stephanocrinus?) pulchellus.

Codaster pulchellus Miller and Dyer. Contributions to Palæontology, Journal of the Cincinnati Society of Natural Aistory, April, 1878.[4]

Body obconical, triangular below, becoming obtusely pentagonal above, the angles coinciding with the ambulacral areas; the exterior surface between these being flat or slightly concave in the upper part. The basal plates constitute a little more than one-third the entire height of the body: plates of the second range much larger than the basal, and deeply indented on their upper margin for the reception of the ambulacra: plates of the third range extremely minute except on the anal? side, where the terminal plate broadly truncates the upper sides of the two adjacent plates of the second range. Central aperture conspicuous, pentalobate. Surface obscurely striated.

In the specimens examined, the minute plates covering the central

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aperture are wanting. The grooves for the attachment of the tentaculæ are distinctly preserved, but no appendages have been seen.

This form differs from *Stephanocrinus gemmiformis* in its narrower proportions and more acute base, and also in the smaller and less elevated plates of the third series, of which one plate is conspicuously larger than the others.

In the structure of the body, at least, there are no differences which appear to be of generic importance between STEPHANOCRINUS and CODASTER. The species under consideration presents all the essential features of the former genus.

CODASTER PENTALOBUS *n. sp.*

Body robust, distinctly pentangular and pentalobate in the upper part, narrowing below ; the basal portion unknown. Summit broad, the ambulacral areas prominent.

The specimen described has a width of over ten mm. in the upper part ; and the width of each side, measured from the base of the ambulacral areas, is about seven mm.

A single imperfect specimen only, has been observed, but its characters are quite distinctive, when compared with any Silurian forms of the genus.

BRACHIOPODA.

LINGULA GIBBOSA *n. sp.*

General form subelliptical, lateral margins curving, rounded at the base, and somewhat abruptly contracting towards the beak ; valves gibbous on the umbones; greatest convexity at about one-third the length from the apex. Surface marked by fine irregular concentric striæ which in some parts become lamellose, and also by concentric undulations.

CRANIA SPINIGERA *n. sp.*

Shell very broadly oval, wider than long, slightly concave on the margin near the apex. Upper valve depressed subconical, apex trans-

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versely subcentral, distant from the concave margin about one-third of the longitudinal diameter. Lower or ventral valve not observed.

Surface marked by very fine, sharp, lamellose, concentric striæ. Entire surface minutely papillose. Shell ornamented with irrregular, interrupted radiating lines or ridges of small, short, tubular spines, diverging from the apex to the margins, and increasing in number by implantation only. These radiating lines are composed of a single row of imbricating spines forming a nearly continuous nodose ridge. The specimen described has over thirty of these rows at the margin.

When in a perfect condition the spines do not show their tubular character, being closed at the extremities. The individual is attached to the dorsal valve of *Rhynchonella Stricklandi*, and exhibits the plications of that shell continued over the CRANIA in corresponding folds irrespective of the surface ornaments.

From *C. setifera* and *C. Siluriana*, with which it is associated, and from any other palæozoic form with which I am acquainted, this species is distinguished by the radiating rows of spines.

ORTHIS SUBNODOSA *n. sp.*

Ventral valve suborbicular, length and width about as 10 to 14 ; hinge-line much shorter than the width of the shell ; an undefined mesial depression on the lower half of the shell ; umbo prominent, beak small and slightly incurved ; area small, triangular, apparently not occuping more than half the width of the valve ; foramen large, reaching to the beak, wider than high.

Surface marked by subangular plications of which there are three in the mesial depression, the central one being interstitial, coming in below the umbo. There are about ten plications on each side of the mesial depression, some of these coming from bifurcation or interstitial additions ; the plications are crossed by lamellose lines of growth, which give them a subnodose aspect.

This species resembles, in some of its features, the *O. fissicosta* of the Hudson river group.

ZYGOSPIRA MINIMA *n. sp.*

A small subglobose form, about as long as wide. Ventral valve extremely gibbous, with a slight emargination in front. Dorsal valve gibbous on the umbo, depressed in the middle, and concave

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towards the front, presenting the feature of a broad, shallow, undefined sinus. Surface marked by strong radiating striæ.

The aspect of this fossil is characteristic of the genus ZYGOSPIRA, but the form is extremely gibbous and has the character of a mature shell, though its length is only two and a half milliemtres.

MERISTELLA RECTIROSTRA *n. sp.*

Shell broadly ovate, acute at the beak, thence rapidly expanding; the dorso-lateral margins nearly straight for one-third the length of the shell, and then broadly curving, giving the body of the shell (in older individuals) a depressed orbicular or sublentiform aspect: younger shells ovate or acute. Valves almost equally convex. Ventral valve most convex a little above the middle, thence curving to the lateral and basal margins; sinus none or very obscure; beak elevated, acute, attenuate, nearly straight or very slightly arcuate; area and foramen triangular without deltidial plates. Dorsal valve very convex above the middle, sloping abruptly to the lateral, and more gently to the anterior margin; beak closely incurved into the triangular foramen of the ventral valve.

Surface usually appearing smooth, but is marked by extremely fine radiating striæ, which give a cancellated appearance under a lens. The larger specimens measure eleven mm. in length by about nine mm. in width.

This species is very distinct from the two other forms of the genus from this locality, both in its proportions and general aspect; but more especially in the nearly straight beak and open triangular foramen. The specimens have the aspect of CRYPTONELLA, but are clearly shown to possess spires arranged as in MERISTELLA.

SPIRIFERA BICOSTATA? var. PETILA.

Shell obliquely subpyramidal, wider than long; hinge-line straight, about four-fifths the greatest width of the shell, rounded at the extremities. Ventral valve gibbous, subpyramidal; beak incurved, umbo prominent, abruptly curving to the basal and baso-lateral margins; sinus visible at the apex and becoming wider and deeper towards the front, margined on each side by a strong plication, and between this and the cardinal extremity on each side are one or more obscure folds. Area elevated, triangular, margins rounded; foramen higher than wide, with elevated margins, and

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occuping one-third of the area. Dorsal valve moderately convex, the greatest convexity just above the middle ; mesial fold indistinct above, becoming prominent towards the base, marked on each side by one or two obscure undulations. Surface marked by concentric undulating ridges, and intermediate fine radiating striæ.

This form resembles *Sp. bicostata* of the Niagara Limestone of New York, but is much smaller and with the ventral valve more elevated.

Triplesia putillus *n. sp.*

Compare *Spirifera? Waldronensis* Miller and Dyer. Contributions to Palæontology, Journal of the Cincinnati Society of Natural History, April, 1878.

Shell small, subquadrate in outline, length and breadth nearly equal, hinge-line straight, less than the width of the shell, extremities rounded. Ventral valve slightly convex on each side of the sinus, becoming concave near the margins ; mesial sinus undefined above, becoming wide and deep below, and produced in front into a long triangular extension ; beak greatly elevated, acute, extending beyond the hinge-line, the apex obscurely marked by what appears to be a minute foramen ; area triangular, wider than high, deltidium triangular, higher than wide. Dorsal valve very gibbous ; moderately convex on each side of the fold, and slightly concave just within the margins; mesial fold commencing about one-third the length of the valve below the beak and becoming very prominent towards the base ; summit of the fold straight, its greatest elevation being at the basal margin ; beak obtuse, closely incurved.

Surface marked by fine concentric lines of growth, which toward the margins become strong lamellose striæ.

The specimens of this species are distorted in their mode of growth, apparently from the natural obliquity of the mesial fold and sinus.

Pentamerus fornicatus var.

Pentamerus fornicatus Hall. Pal. N. Y., vol. ii, page 81, plate 24, fig. 7.

Shell ventricose, larger valve highly arcuate, length less than the width, umbo gibbous, beak strongly incurved ; a broad shallow and undefined mesial sinus extends from the umbo to the base of the shell, having in the centre a low, distinct elevation which gives a double sinus : the median elevation is scarcely so high as the shell on each side, prolonged in front, and terminating in a distinct emar-

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gination for the reception of the median extension of the opposite valve.

Surface marked by fine sublamellose striæ of growth, which are distinctly curved backward on the prominent parts of the shell and forward in the depressions.

This form so nearly resembles *Pentamerus fornicatus* of the Clinton limestone that I can only regard it as a variety of that species.

LAMELLIBRANCHIATA.

Goniophorus speciosus *n. sp.*

Shell subrhomboidal, a little more than twice as long as wide; hinge-line two-thirds the length of the shell; anterior extremity somewhat obliquely truncated; a prominent angulation extending from the beak to the posterior basal margin. Surface marked by striæ of growth which are parallel to the margins of the shell, being gently curved below the carination, and above it turning forward parallel to the truncate posterior margin. Length of specimen eighteen mm.

GASTEROPODA.

Loxonema——?

Compare *Loxonema Leda.* Hall. 20th Rep. St. Mus. Nat. Hist., p. 346. 1867.

Several specimens referred to this genus have been observed, consisting entirely of casts of the interior. They do not possess sufficiently well defined characters to designate them as a species or to refer them to any described form.

PTEROPODA.

Conularia infrequens *n. sp.*

Cone strong, marked by prominent transverse ridges, with intermediate furrows which are gently curved; ridges crossed by numerous strong nodes, which are slightly elongate in a direction transverse to the ridges, and perceptibly wider at their lower extremities; about ten of these nodes in the space of four millimetres

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in the line of the ridges. The intermediate furrows are marked by one or two longitudinal striæ.

This species is larger and the surface-markings coarser than *C. Niagarensis*. In general aspect and surface-marking it may be compared with *C. longa* and *C. lata*, but the cone has apparently been wider than the first of these and not so expanded as the last. No entire individual has been seen.

Coleolus[1] spinulus *n. sp.*

Form a very slender, elongate cone, slightly curving near the apex. Section circular. Length from 2 to 8 mm. Surface ornamented by fine, sharp, annulating, regular striæ, 15 to 20 in the space of 1 mm.

This is the only species yet described from Silurian rocks. Specimens are found in considerable numbers in the softer portions of the shale associated with Leperditia, Beyrichia, and other minute forms which are obliterated in the coarser or pyritiferous shales.

CEPHALOPODA.

Orthoceras medullare.

This species, described in the 20th *Report on the State Museum of Natural History*, is of frequent occurrence in the Magnesian Niagara limestone of Wisconsin; several specimens have been observed in the Waldron collections. It usually occurs in an imperfect and much macerated condition; only one specimen has been observed which preserves distinctive characters.

Orthoceras amycus *n. sp.*

Shell very gradually and almost imperceptibly enlarging from the apex; section circular; septa deeply concave, distant from each other nearly two-thirds the diameter of the tube; siphuncle central or slightly excentric, diameter at the septum one-sixth the diameter of the tube; marked by low rounded annulations which are slightly oblique to the axis of the shell, two to three annulations in the space of one chamber; 24 annulations in the space of 100 mm.

[1] *Coleolus* Hall, unpublished nov. gen., Pal. N. Y., vol. v. part ii, page 184.

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Surface marked by fine concentric striæ which follow the direction of the annulations : no longitudinal striæ have been noticed.

This species differs from *O. annulatum* in the more gently tapering tube, the greater distance of the septa, the low undefined annulations, and the fine concentric striæ, which are not lamellose, and in the absence of longitudinal striæ.

Nautilus Oceanus *n. sp.*

Shell large, discoidal ; volutions closely coiled but not re-entrant ; umbilicus large and open ; transverse section elliptical, the dorso-ventral diameter being the greater. Shell gradually enlarging.

Chamber of habitation large ; length twice the greater diameter, the capacity being equal to, or greater than, the entire septate portion of the shell ; becoming straight, and free from the inner volutions, toward the aperture. Septa regular, two in the space of five centimetres on the ventrum, and five in the same space on the dorsum.

The specimens measure from 20 to 25 centimetres in diameter.

This species resembles *N. occidentalis* of the Niagara group of Wisconsin, but the form is less gibbous and the septa less distant than in that species.

Gyroceras abruptum *n. sp.*

Shell coiled, rapidly expanding towards the aperture : number volutions about one and a half ?, not contiguous. Transverse section broadly elliptical or subcircular ; dorso-ventral diameter the longer. Septa distant, the distance between them becoming gradually greater from the apex toward the chamber of habitation. The last three chambers measure on the ventral side 65 mm., and on the dorsal side about 24 mm. Siphuncle near the ventral side.

Surface cancellated by longitudinal furrows, about one millimetre wide, which are crossed by finer strong lines of growth.

The specimen described has had a diameter of about 15 centimetres.

This species, in a fragmentary condition, may be distinguished from *Nautilus Oceanus* with which it is associated, by its smaller size, more distant septa, and more rapidly expanding form.

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CRUSTACEA.

ACIDASPIS FIMBRIATA *n. sp.*

Fragments of a species of ACIDASPIS occur upon the surfaces of some of the slabs which are mainly covered with Bryozoans. The separated cheek pieces are distinguishable by the numerous straight lateral spines which give them a fimbriate appearance. As many as eleven of these lateral spines may be counted upon a single imperfect cheek. The border of the cheek is but slightly curved and the long posterior spine is nearly straight.

ILLÆNUS (BUMASTUS) IOXUS.

Illænus Ioxus HALL. 20th Rep. St. Mus. Nat. Hist., p. 378, plate 22, figs. 4–10. 1867. Revised edit., p. 420, pl. 22, figs. 4–10. [1870.]

A large specimen of the caudal shield from the limestone, has all the proportions of this species, though of somewhat larger dimensions than is usual with the Wisconsin individuals. The specimen measures 60 mm. in length, with a width of about 75 mm.

In addition to the foregoing species the following known forms have been recognized among the collections formerly and recently made at Waldron: *Buthotrephis gracilis*, *Orthis biloba*, *Cypricardinia arata*, *Orthoceras subcancellatum*, and *Orthoceras annulatum*.

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THE ORIGIN OF FORCE.

By Stephen C. Hutchins.

[Read before the Albany Institute, Nov. 18, 1879.]

In reflecting upon the so-called conflicts between Science and Religion, it has seemed to me that they arise primarily from want of a common starting point; and that if an agreement could be had with regard to the beginning of things, great advantage would be gained. Mankind ought to be willing to see through the eyes of those who see clearest and with the keenest vision. When I look up to the blue vault above, I do not see there all that the astronomer sees. If I then deny the existence of that which is perceived by him, I simply expose my own ignorance, without in the slightest degree invalidating the evidence upon which the facts perceived by him rest for proofs of their existence. If the world will only recognize the truth, therefore, that that which is seen by specialists who have exhausted human power in a given field must necessarily be true, eveu if not perceived to be true by others, and if then it will harmonize these truths in one rounded whole, it will possess the entire sphere of truth. I regard it, therefore, as not inappropriate, in a society largely devoted to scientific inquiry, to endeavor to find this common starting point, in order that we may the more readily harmonize conflicting views in matters of the gravest concern, by accepting the affirmations of all competent investigators in all fields of inquiry, and rejecting all mere negations not based on scientific examinations.

We live in a universe propelled and sustained by Force. If, in the spirit of scientific inquiry, the origin of Force can be ascertained, we may trace its manifestations from their simplest forms to their present wondrous complex development, in such a way as always to preserve full-orbed truth in all its harmonious concord, and without doing violence to anything except the crude negations of incompetent critics.

The author of Genesis tells us that "in the beginning God fashioned the heavens and the earth."

The phrase heavens and earth is phenomenal, expressive of the visible universe. The sentence pictures this universe to our senses,

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tells us that there was a time when it was not, and that in the beginning of its existence God began the work of fashioning it. We are required to fix our minds upon this pre-existing state; this age when neither heavens nor earth existed as now, and when there was something out of which God could fashion them. We are also required to consider the beginning of this work. The English version of the Scriptures uses the word created instead of fashioned; but all expositors concur in saying that the original Hebrew word (*bara*) means to shave, to cut or to shape. It, therefore, implies the fashioning of something which did not exist, out of existing material. The word create originally signified growth; and to create would mean to cause to grow.[1] Fashioning and creation are therefore distinct terms, and in some important respects opposing ideas.

Science also asserts that the heavens and the earth had a beginning. It does not say that God fashioned them; but it says they were fashioned by Force. Science and the author of Genesis, therefore, assuming the existence of unorganized matter, assert that the heavens and the earth were fashioned therefrom. What was the nature of this pre-existing material? Science tells us that an etherial mass spread throughout space, before the spheres existed; and Genesis, as we shall see, can only be rationally interpreted by accepting this hypothesis. Indeed, we may go further, and affirm that a rational interpretation of Genesis will prove this hypothesis to be true, to all who accept it as authority. If we shall succeed in establishing this, then we are justified in now assuming that the primordial universe was a monotonous sea of jelly, and that this etherial fluid, or gelatinous mass, was unillumined by a single ray of light.

This absence of light is rendered certain from the fact that there was an absence of motion — or, the fact that there was an absence of motion renders certain the fact that there was an absence of light; for light is simply the manifestation of motion, or a form of motion. There must have been a time when the primordial ether was absolutely motionless. If we assume that it is a thousand million years since the Laurentian continent first appeared above the waters, we must also assume that there was a definite time when the first impulse of motion was applied which resulted in its appearance. That time may have been countless ages preceding the formation of Laurentide; but, whenever it was, it had a distinct and definite be-

[1] See Six Days of Creation, by Tayler Lewis. p. 49,50

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ginning. No matter how feeble or how forceful that beginning may have been, it is still scientifically true that the beginning of motion was a reality. Any other assumption is illogical and unscientific, and would annihilate chronology. Motion must necessarily have had a beginning; for the further back we place the commencement of motion, the more remote becomes the period when the Laurentian continent first appeared, and the longer becomes each age in the history of the universe, until infinity itself will fail to furnish room for the beginning.

Motion is life. Absence of motion is death. How came this motionless mass of ether to move? If it had had life within itself, it would have moved from all eternity. This assumption would not only annihilate chronology; it would establish pantheism. The same doctrine would follow from a concession that motion was generated by this etherial mass. It is, however, scientifically impossible for a dead universe to generate life in itself. Motionless molecules will not move without the application of an external force. Overlooking this limitless sea of ether, therefore, we can safely assert it as a scientific fact that unless there is a Life external to itself, capable of applying force to it, it will never move. This limitless expanse of death necessitates a limitless Life for its awakening.

In the beginning, therefore, the universe was filled with an etherial fluid, which we can liken to nothing except to say that it was like the palpable, congealed, perceptible breath of God; and there came a time when the all-pervading imperceptible Spirit which exhaled it, gave it momentum, and began to fashion it to suit His purpose.

This limitless mass of motionless ether could never have been moved by anything less than an Omnipotent Power. God and God only, could have fashioned the heavens and the earth therefrom. State in scientific phraseology as you please the nature of this drear waste of monotonous matter, and you must admit it to have been at one time motionless. It is impossible to interject life within it except from a living source. If it had a self-generating power, it must have had the power of self-restraint, to hold that power from all eternity until the time had come for its exercise. That is to make it God. It is scientifically impossible to imagine molecules in motion from all eternity, and yet not effecting changes in form such as we are able to trace in the universe now. It is equally impossible to suppose that anything less than Infinite energy moved this mighty mass. This Omnipotent energy began the work of fashioning the heavens and the earth in the beginning. when the time therefor had

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come. Force, then, is the scientific equivalent for the powor of God.

The force which held the primordial ether motionless, and preserved its equilibrium until the time came for disturbing that equilibrium through the introduction of motion, was just as active, persistent and potential an agency as was the imparting of the first primal impulse, when orderly and systematic disturbance of the original equilibrium occurred. The preservation of the equilibrium of the primordial ether, and its disturbance, were alike acts of the Will exerted deliberately, restraining motion on the one hand and regulating it on the other.

There is no scientific doctrine more firmly established than that of the persistency of force or the conservation of energy. Force being but the scientific equivalent for the power of God, "the persistency of force" is simply the scientific formula for expressing the infinite energy of the Divine power. This energy must have been directed with Infinite wisdom when first called into exercise; for if the force applied to the primordial ether had been either less or greater than it actually was, the results would have been entirely different. Effects are always in exact ratio to causes. Successive chains of events, or manifestations of force, derive their character from the primal moving impulse. The phenomenal is simply the revelation and realization of the forceful, the same as the billiard ball reveals and realizes the power behind it. The real is but the expression and embodiment of the ideal. In the beginning, therefore, Infinite intelligence, forecasting the succession of the ages with unerring vision, adapted the primal impulse so as to secure the precise manifestations of power revealed in the production and peopling of our globe.

The momentum imparted to primordial ether must have had its origin in Divine power; the character of that momentum must have been determined by Divine intelligence; its relation to matter or ether must have been adjusted with Divine wisdom. This Divine Force must have been conscious of possessing an existence distinct from that of the matter to which it applied its energies. Self-consciousness is the essence and evidence of personality. To hold otherwise, would be to make Force a monster power, without consciousness will or emotion — a heartless, grinding, revolving wheel, remorselessly crushing the pitiable and sensible creatures of its blind and unthinking ceaseless action. Against this horrid hypothesis, the judgment of mankind revolts.

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The one of these truths is as scientifically true as the other. The existence of God is as demonstrably true as the existence of a primordial universe of ether. They rest for their truth on human consciousness. They are seen to be true by the psychical sight. Looking back with clear mental vision to "the beginning," Science has seen a universe filled with motionless ethereal fluid or jelly; and a Being more ethereal than ether, everywhere present, the eternal Spirit we call God. No man has seen God at any time. He cannot be localized or handled. He is termed Elohim (plural) so as to include in one comprehensive, all-embracing term, all the manifestations or attributes of Divinity variously incarnated or personified by the ancients.

Belief in the existence of God does not exclude belief in the most radical processes of creation, as boldly advanced by the most progressive scientific investigators and philosophers of the day. Creation by a gradual process, as described by science and really confirmed by Genesis, is a far grander conception of God than the crude notion that He spake the earth into existence in six successive days; or the degrading notion that after He had created man in His image, He rendered it impossible for this creature to ascertain the processes of creation. Why did He not make the universe in one day, or in a single second of time, if a mere impressive display of the power of His fiat was the only purpose? Why has He permitted man to gaze with mystified awe on the universe, even to the analysis of all its parts, if He intended to keep him in ignorance of the origin of matter and mind? This was not His purpose. To build the earth, by successive stages of regular growth, and to people it with a race able to extract from it the secret of its origin, and to maintain steady progress in all knowledge is a far more Godlike way of working marvelous wonders, and winning the admiration and affection of His creatures, than a display of supernatural and unintelligible power to ignorant men and women.

No naturalist has ever been able to detect the organizing differentiating principle of the violet, or of the oak, of the horse or of man. That there is a subtle agency governing the aggregation of molecules in the one differing from the agency which operates in the other no one doubts; nor would we doubt any the more readily if some skeptical chemist should tell us that, because he cannot find it, therefore it does not exist. Nor would we believe in its existence any the more implicitly, if some one should affirm that each of these

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subtle agencies is called into being by a separate and distinct exertion of the Divine Will. Precisely thus, we believe there is a vital and conscious force in the universe called God; and we would believe it none the more implicitly, if some one should re-affirm the notion that He created the universe, or our solar system, or the earth, in six successive natural days instead of shaping it in a longer period; nor would we doubt any the more readily if some scientific sage should say that he had dissected the universe and been unable to find Him.

If we are right in our reasoning, the existence of God is as thoroughly a scientific fact as any fact depending for its proofs upon the processes of induction. It is far more conclusively demonstrable than any fact which has only hypothesis at its base.

Co-extensive with this fact is another which we may consider established. This fact is, that the entire universe is revolving around one common center. When this revolution began, as we have seen, this universe was one monotonous sea of ether. As it proceeded, the inevitable result was the gathering of condensed portions of nebulous matter around new and subordinate centers, in sections larger or smaller, in which the forces of attraction counterbalanced the forces of repulsion; then heat was thrown off into the surrounding space, and became the force which held each revolving section in its place. Thus there was carved out of the revolving ether, a series of nebulous globes, of immense diameters, pursuing their course around the common center of the universe. The center of the section out of which our solar system was carved, was where our sun now is. This section continued its revolutions (in common with other sections), until the inner mass became separated from its exterior; the latter then forming a ring revolving around the former, or central nucleus. This ring, still revolving, subsequently broke up into a number of globes, which ultimately coalesced into one. This globe, still contracting, and the nucleus also contracting, threw off each planet in the form of a circle, each of which circles united finally as separate globes, and continued their revolutions around the central nucleus.

We accept this nebular hypothesis, because it explains all the phenomena of the universe, reducing every manifestation of force to a uniform plan, as simple in its unity as it is multiform in development. We accept the hypothesis of the Divine existence, because it explains the origin of this force. The one hypothesis is as clear as the other; and both must be true. We do not thus eliminate

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mystery from the universe; nothing can do that. But we reduce mystery to the minimum, and adopt an intelligible explanation of the universe, which fully accounts for all its physical and psychical phenomena. It is thus scientifically true that in the beginning God shaped or carved the heavens and the earth out of ether.

On the evening of the first day the unwrought earth was speeding its way around the central nucleus of our system of worlds. Neither the sun nor the earth existed then as now; but in their places were the materials out of which they were to be formed. As the nebulous earth continued to contract, its revolutions increased in velocity. Heat, which is but a form of motion, was liberated in the great contest with gravity; rotation tending to expansion on the surface and to contraction in the interior. In the progress of contraction, atoms approached so near that other laws found practical application. The varying conditions had differentiated atoms. Atoms which were alike tended to cohesion; atoms which were unlike possessed chemical affinities. The process of cooling by the radiation of heat into space hastened contraction, which produced changed conditions among the atoms and new forms of matter. By the constant attraction caused by contraction, cohesion and chemical affinity, heat was set free in such abundance that it could not be stored away. It then took the form of a wave; became radiant heat, light.

As heat is the product of motion, so light is the product of heat. The Hebrews expressed this relation of light to heat with scientific precision, using the same word for both, only changing the pronunciation — as ōr and ūr.

A dark, unwrought globe, followed by one emitting light, is the testimony alike of scientific investigation and the illumination of Scripture. The ancient Psalmist sings the story* grandly as follows:

> And the earth was formless† and empty.‡
> And darkness was upon the face of the abyss.
> And the spirit of God broodeth upon the face of the vapors.
> And God said, Let there be light;
> And there was light.
> And God saw the light that it was good.

*The translation is from "The Theistic Conception of the World," by Dr. Cocker.

†In the original, *tohu* (confused, unwrought).
‡In the original, *bohu* (empty).

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> And God called the light Day.
> And the darkness He called Night.
> And there was evening and there was morning; one day.

The evening was the darkness, the morning was the light, of the first day.

We have passed from the origin of force to the origin of the earth, in order to confirm from Genesis the scientific hypothesis which forms the basis of our argument. The review shows that the entire process was natural, but that the primal impulse was supernatural, being imparted by the Divine Architect. If we should continue our examinations, we would find the same fact apparent; that all operations are natural, all results obtained by a supreme intelligence impelling and governing natural forces.

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ANNUAL ADDRESS.

By DAVID MURRAY, Ph. D., LL. D.

[Delivered May 25, 1880.]

INDUSTRIAL AND MATERIAL PROGRESS, ILLUSTRATED IN THE HISTORY OF ALBANY.

Mr. President and Gentlemen of the Albany Institute:

You have invited me to make one in a long and distinguished succession of members, who have delivered addresses before this society. When I recall the names of those who have preceded me, and the contributions they have made to the annals of this venerable society, I realize that it is no easy task to find something worthy and fitting to say on this occasion and in this presence.

In attempting to fulfil the duty to which I am called to-night, I have thought that it would not be inappropriate and, I hope, not without interest, to present to you a sketch of the material and industrial progress of the country during the period which has elapsed since the origin of this society. And in order that the subject may have for an Albany audience a more direct and personal interest, I propose to illustrate this progress, so far as possible, from facts in the history of our own city. I confine myself to the material progress of this period, because other aspects of this subject have been more frequently presented, and because we shall find in a comparison of the physical condition of the present with even that of the recently past, facts that must prove both striking and instructive. The limit which I have set for this comparison carries us back to the time immediately succeeding the revolutionary war. It was in 1791 that the Society of Arts, which composes the elder branch of the Albany Institute, was founded. This was almost at the very beginning of that wonderful career of growth and prosperity on which the country entered after its struggle for independence — a career which before that time had

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had no parallel in any country, and which since has only been paralleled by other examples in our own.

In this general march of prosperity, Albany held a conspicuous rank. Her situation at the head of the navigation of the Hudson, and in the direct line of travel from New England to the West, gave her unrivaled commercial facilities. The fur trade, which, for a century, had been the chief reliance of Albany, had, indeed, nearly ceased, or been diverted into other channels. But, instead of it, sprang up a new traffic dependent upon and growing out of the immense immigration into central and western New York from New England and from foreign countries. From first to last, no American town has had a more varied or interesting history. It is one of the few cities whose diversified experiences have developed in it a distinct individuality. The old Dutch Colonial period; the period of English administration; the long residence here of an English garrison; the intimate and friendly relations which its people established and invariably maintained with the neighboring Indians; its strategic position in the French and revolutionary wars; its central position for travel and trade; all these have left their indelible marks upon the town, and have given it a character which is a record of its history.

Before proceeding to my subject, I cannot forbear making my acknowledgments for the material which I have combined in this address to the labors of a deceased member of this Institute. No man can ever hereafter write about the history of Albany without being indebted at every step to the previous labors of Joel Munsell. Let us pause a moment at the mention of this name. The words of eulogy, which were spoken on the occasion of his death, are still fresh in your memories. It will always be an honor to the Albany Institute that it gave help and encouragement to him in his work; that he found, in the meetings and associations of this society, that sympathy and appreciation which led him on year after year in those researches which have made his name a household word in this city. Many of you, I dare say, have read the touching address with which he prefaces the concluding volume of his "Annals of Albany." While preparing for this address, I chanced upon an explanation of what had seemed to me puzzling in the manner and contents of that preface. For the first time in all his writings, he refers to the trials and struggles and unsubstantial recompense of his labors. The explanation will surprise no one who knew the appreciative and generous character of Mr. Robert Townsend. In a little manuscript note, appended to the copy I use, Mr. Townsend says: "Mr. Munsell had brought to me to touch

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up a short preface he had written. I told him it would not answer. In justice to himself, this concluding volume of his series should contain something more; and above all it should give some slight sketch of his struggles and sacrifices in continuing his work. As I was well acquainted with his labors, and knew how unrequited they had been, I offered to write a concluding address for him. He gladly consented, and this is the result." Mr. Munsell himself, I think, never complained. It was left to this kind friend to put in words, and such appropriate words, too, those feelings, not which Mr. Munsell had for himself, but which others who knew his work entertained for him. To the world, Mr. Munsell is best known as a printer of rare skill and enthusiasm in his profession, but to Albanians and to his associates in the Institute, he will always be best remembered as the man whose researches, like those of Layard or Schliemann, have rescued a city from oblivion.

1. *General Progress.*

Let us then look at our old city as it emerged from the trials and struggles of the revolution, and entered upon its new career of progress and prosperity. Let us recall its contour, size and general aspect, and draw, if we can, even a rude and imperfect sketch of it, touched up, if possible, with some of the colors of nature. In the old maps of the city (1696), the fort stood at the head of State street, where now St. Peter's church stands. A line of stockades ran off on each side down to and along the river, enclosing the space from Steuben street on the north, to Hudson street on the south. Within this narrow space was included all that there was of the little city. Subsequently the stockades were extended and renewed, probably when fears of the French and Indian wars stirred up the city to greater diligence in its defense. This new stockade followed the line of Hamilton street on the south, and on the north crossed Broadway near Van Tromp street, where the location of the ancient blockhouse and gate was preserved to a late period, as the dividing line between Albany and the *Colonie*.

According to Simeon DeWitt's map, made in 1794, State street still extended only up to Lodge street, where it merged into the Schenectady turnpike. The old fort had been removed, but the ground on which it had stood, and westward, where now the capitol stands, towered up in a high bluff. Capitol hill was a famous place for huckleberries in those days, and all west of Eagle was still left covered with the scrubby pine which was the only vegetation that the poverty of the soil was capable of supporting. Broadway from its junction with State street,

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northward, was then called Market street. It took its name from the public market, which stood in the broad portion of it near Maiden Lane. The street south of State street, to the steamboat dock, was called Court street. South Pearl street, which then as now formed the principal exit from the city to the south, was called Washington street. The broad meadows south of the city had originally been set apart as a common for pasturing the cows of the citizens, and Mrs. Grant paints us a pretty bucolic picture of the cows with their tinkling bells coming home each night to be milked, each one seeking out and taking her place quietly at her master's gate. But by this time the cow pasture had been cut up into lots, and Mrs. Grant's bucolic picture had been spoiled.

The streets must have been as yet almost entirely unpaved. In 1729 the city fathers had indeed issued some kind of an ordinance that the people should pave their streets, but they complained bitterly of the burden, and on one pretense or another, got it put off, so that still in 1792 we hear of General Schuyler's carriage getting mired in State street, opposite Green, and of the whole neighborhood being called out to extricate it. The incident may have made some stir, and helped to work some improvement; for two years later a traveler in giving an account of his visit, compliments the city on the condition of the streets and pavements. Curb stones were a thing unknown at that time, and only a shallow gutter separated the roadway from the sidewalk. The pavement was, of course, the old cobble stone pavement which continues with us till this day. I have made some effort, but unsuccessfully, to discover the inventor of the cobble stone pavement, in order to award to him his due meed of gratitude for the boon which he bestowed on mankind. I would like to have him here to-night and hold up before him the miraculous mirror which the angel of retribution presents to his victim when they are brought to the Buddhist purgatory — a mirror in which he can see all the crimes and evil consequences for which he is responsible.

There was still in the city no system of drains. The surface gutters of the streets served the purpose of carrying off the sewage, and on Mondays, which was the traditional washing-day, the streams of soap suds which ran down the streets made crossing the streets a perilous undertaking.

Water-works were first projected for the city in 1799, at which time a company was formed, which afterward, in 1802, was incorporated as the "Albany Water-works Company." Previous to this time, the sup-

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ply of water for the inhabitants was chiefly derived from wells; and we have the occasional references of ill-natured travelers to the badness of the well water, complaining of its containing all sorts of animalculæ and bad tastes and smells. But we hear no complaints from the natives themselves, either because they had become used to these impurities or because they rarely used it for drinking. They had no patience with these prying, fault-finding, water-drinking travelers, who came with their pocket magnifiers to discover animalculæ, and did not know what water in the economy of Providence was meant for.

The water company purchased from the Patroon the right to take water from Maestland kill, and erected a dam and laid a line of pump logs down Broadway and up Columbia street to a reservoir which has been only recently removed. The main line consisted originally of two lines of four-inch pipes, bored from logs. But subsequently, about 1815, iron pipes were substituted in the main line, and it is mentioned incidentally that the company got the privilege from the Patroon of substituting one eight-inch iron pipe for the two four-inch wooden pipes, a very clever little operation by which they more than doubled their supply of water at the expense of the good old Patroon. The reservoir being on Eagle street, the supply could only reach the streets east of this line. I have copied from the old book of minutes of this company, kindly lent to me by Mr. Meads, who was the last secretary of the company, the schedule of annual charges in 1815:

1st class	dwelling,	3-story double house	$16
2nd	do	3-story, 3 windows in front	14
3rd	do	3-story single, or 2-story double	12
4th	do	2-story, 2 front windows and an L	10
5th	do	2-story single, 2 rooms on first floor	8
6th. Every other			6
Every additional family in a house			3
Distillery			100
Tannery			70
Brewery			60
Morocco factory			50

In 1832 additional iron pipes were laid, and in 1845 the company purchased the right of taking water from Patroon's creek. But the growth of the city, especially westward, made necessary the increase of the supply of water and the construction of new reservoirs. Hence movements were set on foot to establish a city commission to take in

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hand the supply of water. In 1851, this commission purchased all the property and rights of the old stock company and proceeded to construct the works by whcih the city is still supplied.

Next to a supply of water, nothing now seems to us more essential than a supply of light for our streets. What a hardship we should think it to be left for a single night without the comfort and protection of well lighted streets. And yet we only need to go back a few years to find dim and smoky lamps in the place of the brilliant gas-lights, and not very many years more to find our city with no lights at all. In 1812, Sir Walter Scott wrote home from London that "there is a crazy man here, who is trying to light London with smoke." The crazy man succeeded, and in 1813 London was lighted with gas. In this country the experiment was first tried in 1820 in Baltimore, but failed. It was successfully introduced in Boston in 1822. In New York the first gas company was chartered in 1823, but it was not till 1827 that the lighting went into successful operation. The Albany Gas Co. was chartered in 1841, and the streets were first lighted in the winter of 1845. Street lamps preceded gas, and when introduced were hailed as a wonderful advance. In the old colonial times, when the little city was on the outskirts of civilization, and fears of the treacherous French and Indians kept them on the alert, the orders from the authorities were, that at the ringing of the alarm bell, every body should set a candle in his window, so that the patrol could see what they were about, and detect the skulking enemies. Just a century ago, May 19, 1780, was the famous dark day, which covered with its dreadful pall the whole of New England. And in the Connecticut Assembly when it grew too dark to attend to business, Abraham Davenport moved that candles be brought in and that they go on with the debate irrespective of the day of judgment. The incident reminds us that at that time even public assemblies were lighted by candles. What an idea it gives us of the change a century has wrought, when the candle has given way to the lamp, and the lamp faded before the gas, and the gas is preparing to hide its diminished head before the glories of the electric light; when from a flag-staff on the highest pinnacle of the new capitol, one single electric globe shall dispense light to every street, and enable us to go on with our occupations by night as well as by day.

2. *Houses and Furniture.*

The immigrants from Holland came for commercial rather than political reasons. They opened up with the Indians a trade, which

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lasted down to the beginning of the present century. As late as 1796, we find a reference to loads of furs arriving from the Indian country. The fairness and honesty of their dealings with the Indians gave them a strong and permanent hold upon these simple children of the forest. As a result of this, Albany never suffered from the incursions of the Indians, and continued to hold the most intimate and friendly relations with them. This fur trade especially, and afterward the frontier trade, brought great wealth to the city, which displayed itself in the character of the dwellings which they constructed for themselves. Before the revolution, new fashions had begun to spring up in house-building, and the mansions of the more wealthy were built in the English rather than the Dutch style. But still, even long after the revolution, the town to the eye of a traveler had a peculiar Hollandish look. The typical Dutch house stood with its gable end to the street, although the popular opinion that old Dr. Morse, in his first geography, represents the inhabitants in the same attitude, is not sustained by facts. In the ordinary house, the end toward the street was built of brick. The sides and rear were almost always of wooden plank. The roofs were of tile, and sometimes of split pine or cedar shingles. The gables ran up to a peak in a series of steps, and the topmost angle was invariably surmounted by a wind-vane in the form of a rooster. Along the eaves of the houses were fastened wooden troughs to catch the water from the roof. These projected out two or three feet into the street, and in a rain sent down a deluge of water on the unhappy passers. Finally there was so much complaint made of this, that, although the old Dutch burghers stoutly held that it was an infringement of their prerogatives, the common council in 1791 ordered these spouts to be cut off, and the water to be led down in pipes.

Each house had its ample porch, or what the Dutch called a stoop. It had seats on each side, and was covered with a roof, to which an arbor of wild grape-vines or some other climbing vine often contributed its verdure and shade. Here the burghers of the town and their families assembled on summer evenings after the sun went down. The *meinherrs* smoked their pipes in great comfort, and the *vrows* and girls brought out their knitting. The dear old mother tongue was still most often heard in these evening conclaves, although an English neighbor, who had not learned the Dutch, was always greeted in his own speech. In the Dutch church the preaching was still in Dutch, down to the coming of Dominie Westerlo in 1782. The *younkers* gathered in gay and pleasant groups at each others' stoops, chattering

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and laughing, as boys and girls, young men and maidens have always done, and will always do, to the end of the world.

Have you any curiosity to step inside one of these houses, and see how your ancestors lived? Of all the sights I saw in Europe, by far the most interesting to me was the ruins of Pompeii, where, after an interval of 1800 years, we can still see the very rooms where the people lived, the beds where they slept, the kitchens and ovens where their food was cooked, and the very footprints which they left on the pavement. And of all the museums I saw, not one compared in interest with that at Naples, where the furniture and implements and ornaments collected from these houses were open for our inspection.

To know how people were housed and clad, how they ate and slept, to learn their home life, their amusements and occupations, is of far greater interest and of greater value than a knowledge of their legislation, their politics or their wars. The poverty of details in all cotemporary records on such subjects is always to be regretted, so that even the crumbs of information which fall from the letters and diaries of the time are to be thankfully gathered up and set before you as the best that we can do.

Thanks to Mrs. Grant of Laggan, we know pretty well the arrangements and contents of an Albany house a century ago. She spent some years in Albany, when a child, about 1765, and by her talent and vivacity attracted the attention of Madame Schuyler, whose memoirs she afterward wrote. Let us then enter, and although the hundred years that have elapsed may have dimmed and dismantled somewhat the old house, we shall still find that which will interest us.

A great mansion of that time was always set with its broadside to the street, and the entrance was at the middle. Through a door that was divided into two, an upper and a lower, you entered a hall ten or twelve feet wide, and even wider, which ran through the house. There were chairs and settles placed here, and on account of the breeze which generally could be felt, it was a favorite resort in the hot days of summer. At the rear end of the hall, a staircase with a landing carried you to the second story. On this landing stood the old Dutch clock, although by this time they were more often made in England than Holland. On one side of the hall was the parlor, a large square room, with plenty of light let in through the narrow panes of glass with which fashion is making us again familiar. A great fire-place occupied one side of the room, with its brass andirons and fender, beside which stood the shovel and tongs, and bellows. Some stiff, straight-backed chairs; sofas without springs, but comfortably cushioned; queer crooked-

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legged, claw-footed tables with drawers and brass handles; cabinets with choice bits of cut glass, and oriental china, which were then great rarities; some pieces of silver, and a good supply of pewter, which was kept as bright as silver; some trifling curiosities brought from the West Indies or China — such were the things which you found in a parlor of that day. A few books perhaps occupied a shelf or two. No piano* had yet made its appearance, although perhaps the rumors of its introduction in London may have reached them. It was not until 1803, that the first piano was manufactured in Boston. Instead of this, you might find in the wealthiest houses a spinet or a harpsichord. The floor of this grand room was of clear beautiful maple, perhaps curl or pin maple, or some other native wood, which the mop and the broom kept in a high state of polish. It might have been sanded with white sea sand, which the skill of the housewife worked into picturesque figures with her broom. Except perhaps in the richer houses there were still no carpets; and even then they were only small rugs.

The first carpets brought to America were said to have been brought by the pirate Kidd, and were doubtless the result of his encounter with some East Indiaman. Even in England, carpet manufacturing did not secure a footing till 1757, and in America the first carpets were made in 1791, in Philadelphia.

Opposite to the great parlor, on the same floor, was the grand bedroom, reserved for guests. It was as large as the parlor, and like it provided with a fire-place. Here stood a great chest in which was kept the household linen, and, perhaps, a chest of drawers reaching almost to the ceiling. Here too stood the state bed. Look at it with awe and reverence, for if there was any thing to which the Dutch housewife was ever tempted to fall down in idolatrous worship it was to this bed. Like Naaman, the Syrian, she had an understanding with herself, that when she entered that room, and paid a secret worship to it, it was pardonable. Of course it was a fourposter, made of mahogany. It was surmounted by a teester, with hangings and curtains, and had a

*I have recently seen a very interesting specimen of the pianos which were first brought to this country. It makes but an insignificant show beside the great instruments now manufactured. It is about five feet long and twenty-two inches wide. The frame is entirely of wood, and the case of mahogany, handsomely inlaid. But it was the manufacturers' mark which had for me the greatest interest. This reads, "New Patent, Astor & Comp'y, 79 Cornhill, London." No date is given, but it is known that this was one of the instruments manufactured by John Jacob Astor, who for a few years was in this business in London, and who, in 1783, brought out to New York a number of them, which he exchanged for furs. This was the beginning of his dealing in furs, and the foundation of his fortune.

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valence reaching to the floor. It was so high that steps were necessary to mount up to it. The bed was of live geese feathers, and had great feather pillows, kept well aired and sunned. For covering she had her beautiful fragrant linen sheets, spun and woven in her own house, and quilts wondrously patched from her old silk gowns and remnants of ribbon. Blankets also she had, home-spun and home-woven. Over all she had, for cold weather, a down quilt, such as you still see in the houses in Germany and Holland.

The dining-room of the house we will suppose was in the rear extension, behind which were the kitchen, wood-sheds, etc. For winter the dining-room was the principal living room of the family, where a great wood fire was always kept blazing.

At the time of which I write the fire-place, burning wood, was almost the only mode of heating. Dr. Franklin had invented, in 1740, his stove, which he called the Pennsylvania fire-place, but the difficulties of manufacturing them at this time in America prevented their becoming common.

The first stove of which we hear in Albany, although it probably was not the first, was one introduced into St. Peter's Church in 1796, which was cast at Ancram, at the iron foundry on the Livingston manor. The first stoves would only burn wood or bituminous coal. Anthracite coal came into use about 1820, when 365 tons (!) were sent to market.

A new kind of stove was required for anthracite, in which the draft of air should be much smaller. One of the earliest in this field of invention was Dr. Eliphalet Nott, who spent years in perfecting his inventions for heating. In my day the chapel of Union College was heated by one of Dr. Nott's stoves, in which the base-burning principle was used. We had in our rooms, also, a marvelous kind of box stove, which we attributed to the genius of Dr. Nott. The iron was about an inch thick and could be neither broken nor bent. It served as an anvil for all sorts of mechanical experiments, from the cracking of hickory nuts to the splitting of kindling wood. And even if in a playful mood, as occasionally happened, one of them took a flying leap from a fourth story window upon the pavement below, the only injury was to the person who might be standing under it. As for the stove itself it only needed to be carried back and put in its place again.

I need not tell you that in stove manufacturing Albany, for almost fifty years, has maintained a leading position, and to-day sends its stoves to all parts of the world. The familiar name of Albany on my stove in Japan contributed not a little to the comfort and home feeling of our long residence there.

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We can scarcely imagine how great a change has been wrought in dwelling-houses by the improvements in the methods of heating and lighting them. Whether we are with all these improvements more healthy may be a matter of doubt, but there can be no question that we are more comfortable. What would we say now if we had, like our grandfathers, to sleep in rooms where the water froze at night? They hovered in the cold windy weather around open fires, which kept one side hot while the other was freezing. They went to church and sat through an hour's, sometimes a two hours' sermon without fire, where even the men, to keep themselves warm, sat with their hats on their heads and their hands in a muff. On a Sunday morning it was a sight to behold the string of negro slaves who came to the church carrying their mistresses' foot-stoves filled with hickory coals or hot water. I fear you would find in other particulars a good deal less of comfort in the old church than is now deemed essential to the proper worship of God. I venture to give you here a little picture, which has been drawn for us of the church and its equipments of that day:

The church was old, the church was queer;
Would you like to look in on the Sabbath day
And witness their strange, old-fashioned gear,
And gather a hint of the ancient way?

The walls were plain, the roof was square,
The carpets — ah! well, they were not there;
And the pews — of course they were better bare,
For cushions were deemed a carnal affair.
And the Meinherrs, they took in the winter weather
A foot-stove of tin well soldered together,
And filled with water at a boiling heat,
To protect from the cold their freezing feet;
For remember that no one ever hears
Of a stove in a church back a hundred years.

But the pride of the church, the glory of all,
Was the pulpit which towered against the wall.
'Twas set so high, said the wits of the town,
For the preaching was heavy and would settle down.
Like an egg-cup it stood on a narrow base,
While the good old dominie held the place
Of the spoon in the empty shell,
To stir in the pepper and salt, and he stirred them well.
Over his head a sounding board hung,
Like a vast extinguisher above him swung,
Ready to fall and put out his light,
As candles are quenched at dead of night.

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3. *Cloth and Clothing.*

Up to the time of the revolution, our people depended chiefly on Great Britain for their supplies of clothing and clothing material.

During the colonial period the British board of trade, and their agents in America, tried in every way to discourage and repress attempts on the part of the colonists to start home manufactures.

In 1705, Lord Cornbury writes to Secretary Hodges: "I am well informed that upon Long Island and Connecticut they are setting up woolen manufactures, and I myself have seen serge made upon Long Island that any man may wear. Now, if they begin to make serge, they will in time make coarse cloth and then fine. The consequence will be that if once they can see that they can clothe themselves, not only comfortably but handsomely too, without the help of England, they who are not very fond of submitting to England would soon think of putting in execution designs they have long harbored in their breasts." (Doc. Hist. I, 711.)

Mr. Caleb Heathcote writes in 1708, to the board of trade in London: "What in the first place I arrived at in my proposals was to divert the Americans from going on with the linen and woolen manufacture, and to have turned their thoughts to such things that might be useful and beneficial to Great Britain. They are already so far advanced that three-fourths of the linen and woolen they wear is made among themselves." (Doc. Hist. vol. I.)

But Governor Cosby, in 1732, did not see so much danger to British manufactures, for he writes to the board of trade: "The inhabitants here are more lazy and inactive than would generally be supposed, and their manufactures extend no further than what is consumed in their own families, a few coarse linsey-woolseys for clothing, and linen for their own wear."

Subsequently, in 1767, we find Governor Moore reporting to the board of trade about some small manufactures being set up by one Wells, who is supported by a set of men who call themselves the "Society of Arts."

But, in spite of these discouragements, the enterprising spirit of the people, and indeed the necessities of their situation, led to the rapid development of cloth making. The Hollanders had brought with them their knowledge of making linen, and custom and tradition had kept alive in every family the skill which this art required. Every house had its spinning wheel, and every farm its patch of growing flax. Mother and daughters and servants were all employed as they had time

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in spinning flax or wool. The weaving was sometimes done in the house by itinerating weavers, but more frequently the yarn was given out to be woven by persons who made this their occupation. Not only plain linen was made in this way, but even the more ornamental, which was required for table and toilet use. The pride of every mother of a family was not only to have her own house well supplied, but to have ready against the time of marriage an outfit for each of her daughters. Stockings, of course, were knit in the house for the family, and it accounts for the good temper and amiability of our grand-mothers that they found, in the swift flying needles, points of discharge for the irritability which otherwise might have gone to make their husbands uncomfortable.

Woolen cloth, also, was largely home-made. The first prizes which were given by the old "Society of Arts," from which this Institute took its origin, were for the manufacture of woolen cloths, and there are preserved in the library of the Institute several volumes of specimens of these prizes. The spinning and weaving were mostly done at home, but there were small fulling mills where the web was dyed, fulled and dressed. The cloth produced in this way was not as fine as French broadcloth, but was warm and durable, and had no shoddy mixed with it. We have it mentioned as a notable fact that in 1790 President Washington appeared in a suit from cloth made at a mill in Providence, Rhode Island. Serge and linsey-woolsey were of course the principal materials for the ordinary female dress. But the prosperity which Albany had enjoyed before the revolution, and still more afterward, had doubtless brought hither habits of luxury and elegance which could only be satisfied by the rich materials from abroad.

To you who are familiar with the rich female costume of the revolutionary period, it is not necessary that I should describe it in detail. Let it suffice to say that in richness of material, in the elegance and taste of arrangement, it has never been surpassed. I venture, however, to insert here a memorandum taken from the papers* of General Washington, containing a list of articles to be purchased by his agent in London, and sent out for Mrs. Washington and her daughter. It will show to those growling husbands, who are disposed in these days to find fault with the luxury and expensiveness of their wives' toilets, that they have very good examples for making a liberal provision for those whose appropriate and becoming decoration reflects honor on themselves.

* Quoted by Mr. Lossing in his "Centenary of Progress."

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"1 silver colored tabby velvet of the enclosed patterns, with satin flowers, handkerchief and tucker and ruffles to be made of Brussels lace or point proper to be worn with the above negligee, to cost £20; 1 piece bag Holland, 6 shillings a yard; 2 fine-flowered lawn aprons; 2 double handkerchiefs; 2 pairs women's white silk hose; 6 pairs fine cotton ditto; 4 pairs of thread ditto; 4 threaded; 1 pair blankets and 1 pair of white satin gloves of the smallest fives; 4 pairs calamanco ditto; 1 fashionable hat or bonnet; 6 pairs women's best kid gloves; 6 pairs ditto mits; half doz. knots and breast knots; 1 doz. round silk stay laces; 1 black mask; 1 doz. most fashionable cambric pocket-handkerchiefs; 2 pairs neat, small scissors; 1 pound sewing silk, shaded; real minniken pins and hair-pins, and 4 pieces binding tape; 6 pounds perfumed powder (for the hair); 3 pounds best Scotch snuff; 3 pounds best violet Strasbourg snuff; 1 piece narrow white satin ribbon, pearl edge; a puckered petticoat of a fashionable color; a silver tabby velvet petticoat; 2 handsome breast flowers."

"For Miss Custis, six years of age: A coat made of fashionable silk; a fashionable cap or fillet with bib apron; ruffles and tucker to be laced; 4 fashionable dresses to be made of long-lawn; 2 fine cambric frocks; 4 satin capuchin hats and neckatees; a Persian quilted coat; 1 pair pack-thread stays; 4 pair callamanco shoes; 6 pairs leather, ditto; and 2 pairs satin, ditto, with flat ties; 6 pairs fine cotton stockings; 4 pairs white worsted, ditto; 12 pairs mits; 6 pairs gloves, white kids; 1 pair silver shoe buckles; 1 pair neat sleeve buttons; 6 handsome egrets, different sorts; 6 yards ribbon, ditto; 1 pair little scissors; 3 M large pins; 3 M short whites; 3 M minnikens; 1 fashionable doll to cost a guinea; 1 ditto, at five shillings; a box of ginger bread. Toys and sugar images and comfits. A neat small bible bound in Turkey, and Martha Parke Custis wrote on the inside in gilt letters. A small prayer book, neat and in the same manner. Twelve yards coarse green calamanco; one very good spinet to be made by Mr. Plinius, harpsichord maker in South Audley street, Grosvenor Square. Send a good assortment of spare strings to it."

Of course the gentleman of the period could not be expected to compare in elegance with the grand dames. Yet with his coat of black, brown or drab cloth, his knee breeches of plush or velvet, his fine ruffled linen, his silk stockings, and his shoes with their silver buckles, he made no insignificant figure, even in comparison with the full-dressed gentleman of to-day.

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4. *Travel and Transportation.*

Under this head, let us first consider the improvement in carriages. The evolution of the carriage is a most curious and interesting subject. It seems strangely connected with the state of civilization in a country. Wherever the human mind has been most active, there the carriage has been most rapidly developed. Before the revolution, there were scarcely half a dozen family coaches in the province of New York. When Robert Murray, the Quaker merchant in New York city, after whom Murray Hill is called, set up a carriage, it was so unusual a step that he felt called upon to excuse himself, on the ground that he lived three or four miles from his place of business. Traveling then was mostly on horseback, and the country roads were so bad that nearly all the transportation had to be carried on by pack horses. But the American inventive mind has surpassed itself in improvements of wheeled vehicles. Even the most elaborate of the state coaches that you see at the museums of Paris and Versailles are crude, clumsy affairs, compared with the modern coach. Solomon in all his glory rode in a chariot without springs. Even as late as 1785, the best that had been attained was to suspend the body of the carriage on strong leather straps, so as to give it in passing over obstacles a rocking motion. Then came the invention in 1795, in England, of the elliptic steel spring. But it was long before carriages with these springs were manufactured in America. Far into the present century the old leather strapped coaches were used. It is within the memory of living men that spring wagons have become common in the country. It was only in 1830, that an American blacksmith invented the method of making a wagon tire in one continuous hoop. Before that time they were put on in pieces. Fifty years ago Albany had a leading position in the manufacture of carriages, and her fame in this particular has been well maintained.

The omnibus originated in Paris in 1825, and they were running in Broadway in New York in 1830. The stage-coach was from an early period a great institution in Albany.

Albany lay in the direct line of travel to the western and northern part of the State. A continuous stream of immigrants poured through it into the rich regions of the Genesee valley. They came up the Hudson river in boats or across from Massachusetts and Connecticut. They crossed over the turnpike to Schenectady, and then followed up the Mohawk. Stage lines were started to accommodate this travel. In 1785, a company was started to run a line from New York to Al-

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bany, making the journey in two days at threepence per mile, and carrying the mail which came twice a week. Then, in 1789, a stage began running between Albany and Lansingburgh, and in 1790 between Albany and Schenectady. And from this time every year saw their number multiplied and their routes extended, so that by 1811 a line of stages connected Albany with Niagara Falls in the almost incredible time of three days. The fare from Albany to Utica was $5.50; from Utica to Geneva, $5.00; from Geneva to Canandaigua, $5.75; and from thence to Buffalo at six cents per mile. The coming and going of these stage lines made lively times in Albany, and the tradesmen and the publicans flourished.

But so far as Albany is concerned, water communication has always been the rival in importance of that by land. The noble river whose navigation practically ends here has brought hither a continued stream of prosperity. In 1791, April twelfth, it is noted that forty vessels arrived at or passed the city. Notwithstanding the establishment of the stage lines, the journeys to and from New York were chiefly taken on sloops, which had pretty little cabins fitted up for passengers. It was a perilous journey in those days, and required often as much time as to cross the ocean now. When men set out on this journey they made their wills and bade each other farewell, not knowing but the perils of the Tappan-Zee and of Anthony's Nose might make this journey their last.

But the navigation of the Hudson was soon to receive a tremendous impulse by the introduction of steam. Robert Fulton, the inventor, had the good fortune to meet with Chancellor Livingston, the patron and promoter. After years of study and trial and experiment, they built a little steamboat, which was called the Clermont, after Mr. Livingston's country seat. It was 130 feet long, 18 feet wide, and drew seven feet of water. On the morning of Friday, the 7th of August, 1807, the little steamboat left New York, having on board Fulton and his friends. A little way out they stopped to adjust something in the machinery. The crowd on the shore thought this meant another failure, and shouted after them with jeers and mockery; but their jeers were turned to wonder and awe, when they saw the steamer ploughing its way along against wind and tide and leaving behind its long pennon of smoke and steam. After frightening the people along the shore, they reached Albany, and we may imagine the surprise and astonishment which filled the city when this strange monster of the deep came steaming up and anchored off the town. I can imagine no grander moment in a man's life than a triumph like this. When a

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general wins a great battle his hour of success is embittered by the thought that it has been attained by the destruction of thousands of friends and foes. But when Fulton and Livingston triumphed in their efforts to establish the possibility of navigation by steam, there were no drawbacks to their satisfaction. They could feel that they had conferred a benefaction on their race which could be alloyed with no element of regret. From that day to this, steam navigation between Albany and New York has never for a single season been interrupted, and has never ceased to receive improvements every year.

The next great step in the material progress of Albany and of the State of New York was the construction of the Erie canal. The State of New York has the advantage over all her rivals of having within her territory the line of greatest depression between the ocean and the great western lakes. The river at Albany is only five or six feet higher than at New York. The valley of the Mohawk, which connects with the Hudson, penetrates far into the interior of the State. The early traders pursued this line of travel. They avoided the great falls at Cohoes by crossing the plains to Schenectady. In bateaux they pushed their way up the Mohawk to Rome, and from there, by portages, they made their way to Wood's creek and the Oswego river, into Oswego lake. This easy line early attracted the attention of the great statesmen of that day. The names which deserve especial mention as connected with the great canal system of the State are General Philip Schuyler, Elkanah Watson, Gouverneur Morris, Stephen Van Rensselaer the senior, Simeon De Witt and De Witt Clinton. I have not time to detail the struggles and difficulties encountered by the promoters of this great work. Clinton, whose name will always be associated with it, saw the work begun during his term as governor in 1817. And in 1825, when he was again governor, he had the satisfaction to officiate at its formal opening, when a keg of water which had been brought on the canal, 352 miles, from Lake Erie, was by him emptied into the sea at New York.

This was the turning point in the history of the State and city of New York. If there had been before any doubt about New York being the Empire State, and the city of New York the national metropolis, these doubts were forever put at rest.* And of this great increment of prosperity Albany secured more than her full share. She sat at the junction of canal and river. And as boats filled with the floating products of the west, and in turn with the commercial

* Here are the figures which told the story. Before, to carry a ton of freight from Buffalo to Albany, took 20 days and cost $100; after, it took 10 days and cost $3.

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staples of the east, were carried by, she has always been able, like the free cities of the Rhine, to collect her toll on the passing trade.

But we must not forget the improvements which had been taking place in travel and transportation by land, while steam navigation and internal canals had been transforming that by water. The first railway charter granted in the United States was to the Mohawk and Hudson R. R. R. Co., in 1825. It was not the first railway to be built, but the first to be chartered. The road was running in 1830 between Albany and Schenectady. The Albany terminus was at the south end of the city, and an inclined plane with a stationary engine carried the cars from the river level to the summit of the plateau. From here they were drawn by a locomotive to the summit of another inclined plane, by which they were let down to the level of the Mohawk at Schenectady. In an interesting picture which is familiar to you all, we have preserved to us the appearance of this first train of cars, as it made its memorable trial trip on the 9th of August, 1831. The names of the passengers deserve to be here transcribed : John Townsend, afterward mayor, ex-Gov. Yates, Charles E. Dudley, Lewis Benedict, Thurlow Weed, Edwin Croswell, John I. Boyd, and Billy Winne, penny-post. David Matthew was the engineer, and I. S. Clark, conductor. The locomotive was called "DeWitt Clinton," and weighed four tons; a modern locomotive weighs thirty-two tons. The cars were literally the old-fashioned stage-coach bodies set on railway trucks. They were coupled together by three-link couplers, and were without brakes. In slowing up and starting, this primitive contrivance made a terrible jarring and clatter. The sparks from the wood-burning locomotives were blown in upon the passengers, who, at the end of their journey, found themselves frequently with holes burned in their coats.

For the convenience of passengers at Albany a branch was laid in 1833 down Little State street to a station in State street where Van Vechten Hall now stands. From here the passenger cars were drawn by horses to connect at the junction with those brought up the inclined plane. But this was expensive and inconvenient and was soon abandoned, much to the disgust of the Albany people, who avenged themselves by starting a line of stages to Schenectady, which they continued to run for some time at a great loss. Finally, engineering skill found ways to dispense with the inclined planes, both at Albany and Schenectady, and in 1843 the lines were laid in their present location.

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Other roads followed the building of this one; the Schenectady and Utica; the Utica and Syracuse; the Syracuse, Rochester and Buffalo, and the Rochester, Lockport and Niagara Falls railroads. This chain of railways was complete in 1845, and the time from Albany to Buffalo was reduced to fifteen hours.

In 1853, these various lines were consolidated into the New York Central under Erastus Corning as president. The Hudson River railway was completed in 1851, and in 1869 was consolidated with the New York Central, thus forming a continuous line under one management from New York city to the western limits of the State. The growth of the railway interests here, and the necessity of through transportation, suggested the construction of a bridge across the Hudson river. These facilities, including lines to Boston, to the north and to the Susquehanna, have made Albany one of the great railroad centers of the country.

In the continuation of my subject I might have had something to say of the improvements in the communication of news; the development of the postal system of the country; the enormous and rapid growth of the express business; the rise of the telegraph, with its lines by land and sea; the district telegraph, the telephone, photography, printing, wood engraving, lithography, photo-lithography, and a hundred other inventions and improvements which have now become the necessaries of modern life. It is simply amazing! we cannot grasp the conception of what has been accomplished. Are we the same race, with the same feelings and aspirations as the generation of a century ago, and will another century see as great advances as the last?

And yet it is a perfectly reasonable inquiry to ask, what has been gained by all this. These material surroundings are not, after all, the man himself, and it is pertinent to inquire whether all these changes in his surroundings have changed him, the man. Instead of cabins we live in palaces; we are clothed in garments such as the kings and nobles of the earth could not once have obtained. Instead of ox carts we ride in palace cars, faster than the wind! What is the good of all this? It is Emerson who utters the profound reflection, that the question whether it is any advantage to a man to travel in a day, where before he required a week, depends altogether on the fact whether he would make a good use of the six days thus gained. Time gained is not in itself an unmixed good. If the man is to use his time for base uses, he had better be kept on the road. But these are ill-natured reflections; they go upon the principle that the evil is more powerful

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than the good. We cannot prevent the perversion of blessings by the evil disposed, but we need not deny ourselves the comfort of them for that. Six months after the introduction of chloroform, it was used for stealing hogs, but we cannot give up the blessing of anæsthesia because thieves have used it. Neither can we give up the good to be got from the improved methods of travel and communication because bad men use them.

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WHITTINGTON AND HIS CAT.

By Ernest J. Miller.

[Read before the Albany Institute, Dec. 7, 1880.]

So much attention has been given of late years to the history of our proverbs, nursery rhymes and nursery tales, that I offer no apology for the subject I am to present to you this evening. By the formation of folk-lore societies, both in this country and in England, this particular kind of investigation has been fostered and increased; and all the facts that are ascertained, all the old customs that are explained, all the familiar stories that are traced to their origin, are esteemed as so many contributions to the history of the times to to which they refer. And they no doubt give us a correct view of how our ancestors lived; what they ate and drank; how they spoke the language we speak, and how they thought, and oftentimes what they thought about; and in this way we learn the history of the people as individuals, which is fully as interesting as their history as a state or nation. The person to whom I shall call your attention this evening was a high-minded, noble, honorable, benevolent man, fully justifying the title that has been given him, "the model merchant of the fourteenth century," and I only regret that I have not been able, with the resources at my command, to give a more extended and complete account of his life and good deeds. His biography has been partially written; but even if I could have found a copy of it — which I could not — I deem it better that I should gather what facts I *could* find, and present them to you, rather than avail myself of another's labor in this respect. In order, then, that we may understand this subject as I desire to present it, I must ask you to bear with me, while I relate, substantially, the nursery tale of Whittington and his cat, as I find it in the chap-book of the present day; and perhaps while you are hearing it, you will renew your youth, and the early days will come back again.

Little Dick Whittington was born in the northern part of England, in the reign of Edward III. His parents died when he was very young; and the little fellow was left to shift for himself, earning a living by holding horses and doing such errands as he could get

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to do; but it was little he could make in that way, and so he was very poor and often hungry. As he lounged around the tavern in hope of earning a few pence, he listened to the talk of the wagoners who congregated there, and learned that there was a far-off place called London, and if any one could get there, he would have plenty of money; for its streets were paved with gold. To get to that happy place became then the object of his life; and after some hesitation, he communicated his great desire to a wagoner, who kindly consented to take the little fellow to London on his next trip. In due time, therefore, little Dick was landed in London; and he ran up one street and down another in the eager hope of finding the one that had the gold pavement. But he found nothing but dirt and stones in the street — the passers-by paid no attention to his requests for alms, for he had no money and had nothing to eat — for was he not the same as all other beggars, and was not his piteous story just as much a lie as those they were accustomed to hear every day? — and so the poor little discouraged boy laid himself down on the steps of a mansion, expecting to die of starvation, in the midst of the plenty that was all around him. The mansion belonged to Mr. Fitzwarren, and he, coming out of the house, was surprised to find the boy on his steps; and gently chided him for his idleness and his apparent unwillingness to work. The boy replied that he would gladly work, but could find nothing to do; and attempting to rise, almost fell down again from his great weakness. Mr. Fitzwarren, seeing what the trouble was, sent him into his house, gave him a good meal, and then hired him to do the dirty work for the cook in the kitchen. The cook was cross and old; and when she wasn't basting the meats, was basting poor Dick with a broom handle; so that his life was not a particularly happy one. To add to his troubles, he was sent to sleep in a garret, the floor of which was full of holes; and the rats and mice running around the room and over his face, made the night more unpleasant for him than the day had been. He, however, had received a penny for blacking the boots of a guest of Mr. Fitzwarren; and once meeting a little girl with a cat in her arms, bought the cat of her. The cat was his great and only treasure — his constant companion — his all. The kind merchant, having a ship that was ready to sail for foreign parts, called all his servants into his parlor, and explained to them that it was his desire that each one should have some interest in the venture he was about to make; and that he would permit each of them to send in the ship whatever he chose. Poor Dick had nothing but his cat; and at the suggestion of Miss Alice, Mr. Fitzwarren's daughter, with tears

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in his eyes he brought puss down and gave her to the captain, who immediately thereafter set sail. His life was more lonely than ever, now that his only friend was gone; and his enemy, the cook, added to her cruel treatment by making fun of him because he had sent his cat to sea. At last he could stand it no longer and determined to run away; so on the morning of All-Hallow day, which is November 1st, he left his home and traveled as far as Halloway, and sat there on a stone to rest. While he was resting, the six Bow bells began to ring; and they seemed to say to him:

"Turn again, Whittington,
Thrice Lord Mayor of London town!"

It was to him like the revelation of his future life; and he went back at once to his pots and pans, and brasses and bastings.

In the mean time the ship with the cat on board was driven on the coast of Barbary, which was inhabited by Moors. The captain sent samples of his goods to the king of the country; and in return the king invited him and the mate to the palace, where they were royally entertained. A sumptuous repast was prepared; but no sooner were the dishes set on the table, than the rats and mice ran from all sides, and devoured what was on them. The captain asked the king if they were not offensive to him, and the king answered that he would give half of his wealth to be rid of them. The captain, recollecting poor Dick's cat, said he would help him, and going back to the ship, he brought puss up under his arm. The tables were once more covered; the rats and the mice made the usual onslaught, when the cat jumped out of the captain's arms and slew the intruders in great numbers, to the delight and amazement of all present. The king out of gratitude purchased the whole ship's cargo, and in addition gave a prodigious quantity of gold for the cat, and the captain then set sail for England. Arriving there, those who had sent anything by the ship were again summoned by Mr. Fitzwarren to receive their share of the profits of the voyage; when, to the surprise of all, Whittington received by far the largest portion, and his wealth was, by this single venture, greater than that of the merchant who had given him the opportunity of making the investment. He was now enabled to dress himself as a gentleman, and when he was shaved, and his hair curled, and a brave new hat on his head, Miss Alice, Mr. Fitzwarren's daughter, thought he was really a fine looking young fellow; so the good merchant consented to their marriage, as many a father has had to do before when he couldn't help himself; and in due time Richard Whittington fulfilled the prophecy

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of the Bow bells, and his memory has ever since been embalmed in English story.

This is the substance of the nursery tale — for I have taken the story-teller's privilege of telling it in my own way — and I think it has usually been considered as of the same class as Jack the Giant Killer, Jack and the Beanstalk, Tom Hickathrift, and Puss in Boots—almost wholly legendary, composed by nobody knows who, and descended to us, nobody knows how. And yet, despite the legend related in it, it is a veritable history of a model merchant of the Dark Ages; and how the story has survived to the present day is perhaps the greatest mystery connected with it. For Whittington was born only a century and a half after the English nobles compelled King John to sign the declaration of English liberty at Runnymede. Rienzi, the last of the Roman tribunes, resigned his power, and was sent into exile, less than twenty years before Whittington's birth; Wat Tyler's insurrection was put down by Sir William Walworth, who preceded Whittington as Lord Mayor of London by less than twenty years; and he had been dead only about thirty years when Faust and Schæffer printed their first book, and about seventy years when Columbus discovered America. He lived and died in the Dark Ages; and the wonder is that his story has come down to us at all; for I venture to say that the only things remembered about him are, that he was wealthy, that he was Lord Mayor of London three times, and that he had a cat. But other men in that time were as wealthy, though very few made so good use of it; but notwithstanding their wealth, they are forgotten, and the good use *he* made of his is scarcely remembered. Sir John Lofken, fishmonger, was four times Lord Mayor, and Sir Nicholas Brember, grocer, served for three successive terms, and had been Lord Mayor before the three terms began, and all these four years were in Whittington's lifetime, and many others filled the office three times and more; yet their names have not come down to us through five hundred years. I think that but one answer can be given to our inquiry; and that is a modern answer, but it has come down to us through the centuries—"it was the cat."

But whatever the reason was that caused this story to be remembered, it differs from the ordinary class of nursery tales, in this, that there is more truth than fiction about it. No matter with what other variations the story may be told, it is always sure to represent Whittington as a poor little barefooted, bareheaded, half-clothed boy born of poor parents, whose early death left the little fellow entirely alone. With the exception of the early death of his parents, this statement is

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wholly without foundation, and was no doubt originally made, to heighten by the contrast the exalted position to which he attained. His father was Sir William Whittington, Knight; and an honor of that kind was not easily obtained in those days, nor so lavishly bestowed, as it is now. But besides that fact, by the pedigree of the family in the Heralds' College and British Museum, it is shown that our hero was descended from the Whittingtons who, as early as the reign of Edward I., were owners of land in Gloucestershire, so that the family were landed proprietors; and Richard may have been poor as compared with his brother, who was the elder son and so heir of the estate; yet it could not have been any such depth of poverty as the story would lead us to suppose. Nor does the fact that his father was branded with the stigma "utlagatus" the outlaw, prove that the family were poor; for the outlawry neither tainted the blood nor confiscated the estate; since he was outlawed simply because he would marry Joan the widow of Thomas de Berkley, without the king's consent, or in opposition to it; for in the time of Edward III., injunctions were issued against second marriages, whether avowed or secret; and they were punished with a degree of severity that was in accordance with the maxims of the times, but which we, at the present day, can hardly understand.

But however untrue the story of his poverty may be, there is no doubt of the fulfillment of the prophecy of the Bow bells made to the young wanderer, as he sat on the stone on Highgate hill. Nor is it difficult to understand how the boom of the bells should seem to say —

"Turn again, Whittington,
Thrice Lord Mayor of London town,"

as the principal vowel sounds in the sentence would be used, if we wished to imitate the round full tone of a bell; still there has been another conjecture offered, which is curious, even if we cannot accept it.

Whittington was from Gloucestershire in the north of England, and his family for many centuries lived there. Now Gloucester was one of the earliest bell foundries in England, having been established at the beginning of the century in which Whittington was born; and this, together with the earlier one established at Salisbury, were probably the only bell foundries in the kingdom. The monks of Ely at London employed the Gloucester bell founder; and it is not unlikely that the parishioners of Bow had obtained their bells from the same source. So when the bells sounded, they may have recalled a home feeling to the young apprentice, and touched a chord in his heart, that induced him to return again to his duty. But be this as it may, he was three times

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Lord Mayor of London; the first time in 1397, in the reign of Richard II., when he was only thirty-seven years old, having been sheriff four years previously, as without having filled that office, he could not be eligible to the office of Lord Mayor; then again in 1406, in the reign of Henry IV., and for the last time in 1420, in the reign of Henry V. I always supposed that this thrice election was a tribute to Whittington's popularity and worth; but antiquaries never leave us to the enjoyment of our pet theories, but are continually knocking them to pieces by hard facts and dry logical conclusions; and they have fallen upon this theory and have endeavored to demolish it, as they have many others; they admit his popularity and worth, however, only denying that his being elected three times proves it. Between his first term and his second, a period of nine years elapsed; and when he was called to serve the third time, it was twenty-three years since he had first filled the mayor's chair. In the time of Whittington, aldermen were frequently called upon to take this office more than once. Sir William Stonden, grocer, who had been mayor in 1392, succeeded Whittington; and Stonden himself was succeeded in 1408 by Sir Drew Barentine, goldsmith, who had succeeded Whittington in 1398; and from these different successions in different years, it is argued that Whittington's frequent occupancy of the office arose from the fact that, all the aldermen having occupied the chair, it became the turn of the senior members to serve again; so that the repetition of election arose from the paucity of candidates of sufficient station, capable of bearing the expenses of the office, rather than as a tribute to his personal popularity and virtues, which his fellow citizens only discovered after such long periods as nine and twenty-three years. But it may be doubted whether this argument is as strong as it appears; for it is founded on the fact that the Lord Mayor was always elected as he is at present. The electors now are the liverymen of the several companies of London, who meet in Common Hall on the 29th of September in each year; and to this company so assembled, the crier reads a list of aldermen in the order of seniority, who have served as sheriff, and who have not already passed the chair of mayoralty. In ordinary cases the first two persons named are accepted; and although the livery may depart from that order, or even select those who have already been elected and served, still it is not the usual course to do so. The two names finally determined upon are announced to the mayor and aldermen by the common sergeant; and they also generally select the senior alderman, although they have occasionally rejected the senior and chosen the other candi-

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date presented by the livery. The person elected declares his acceptance of the office; the Lord Mayor, recorder, sheriffs, crier and common sergeant return to their hall, and the proclamation of the election is made. It only remains to present the successful candidate to the Lord Chancellor, to receive, through him, the assent of the Crown to the election, and then to administer the usual oaths before the mayor and aldermen.

But the city records of London show that in the earlier days, a much larger and more popular constituency than the liverymen of the different companies, claimed the right to elect the Lord Mayor; so large a constituency, indeed, that it is supposed to have comprised the whole body of citizens. For Richard II., in whose reign Whittington was Lord Mayor for the first time, had shown a determined and open hostility to the citizens, partly because they had manfully remonstrated against the acts of his ministers, and partly because he was envious of their wealth; and when they had fallen under his displeasure, they could only purchase his forgiveness by large contributions of money. Sir Nicholas Brember, whom I have before mentioned as having served as Lord Mayor for three consecutive terms, was a creature of the king's, and he forced him on the citizens as Lord Mayor several times, in defiance of their wishes and rights; and this was one of the elements of the struggle between Richard and the Londoners. This struggle rose to its climax in 1382, when the citizens selected John of Northampton as an opposing candidate to Nicholas Brember; of the particulars of this struggle we have no account, although the poet Chaucer, who was deeply interested in it on behalf of the citizens, tells us that they would have submitted to every imaginable disadvantage rather than have suffered the manner and rule of the hated governors; and when Brember endeavored to hinder the election, and procure one in favor of himself, then the insurrection broke out, or as Chaucer expresses it, "mokyl roar arreared." The insurrection was put down by a large body of armed men under Sir Robert Knolles on behalf of the King; and Sir Nicholas Brember was again duly installed. How deeply Chaucer as a simple citizen was interested in these proceedings appears from the fact that he fled to Zealand to escape the trial which had been commenced against him. Venturing back to London in 1386, he was elected member of Parliament for Kent; but this very election may have determined the government not to overlook his former conduct; for he was arrested in the latter part of that year, and sent to the Tower and deprived of his offices, namely, the comptrollership of the customs

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in the port of London, and the comptrollership of the small customs. Contrasting his former with his present estate, he touchingly says: "Although I had little in respect (comparison) among others great and worthy, yet had I a fair parcel, as methought for the time, in furthering of my sustenance; and had riches sufficient to waive need; and had dignity to be reverenced in worship; power methought that I had, to keep from mine enemies; and me seemed to shine in glory of renown. Every one of these joys is turned into his contrary; for riches, now have I poverty; for dignity, now am I imprisoned; instead of power, wretchedness I suffer; and for glory of renown, I am now despised and fully hated." He was set at liberty in 1389, and it would certainly appear from this account, that in the early history of London, the citizens had more voice in the selection of their chief magistrate than they have at present. So that after all, if it pleases us to consider Whittington's elevation to office as a grateful tribute on the part of his fellow citizens — and they had good reason to think well of him — we are not running contrary to historical facts in so doing.

There is but one other fact in the nursery tale to which I would now call your attention, and that is his marriage; his wife was Alice Fitzwarren, the daughter of the gentleman on the steps of whose house he lay down to die, and who had befriended him as a poor boy in her father's house, and who had given him a penny to buy another cat, when he had sent his first one on its renowned venture. For Stow, in his history of London, informs us that Richard Whittington rebuilt the parish church of St. Michael in the Royal, and made a college of St. Spirit and St. Mary, with an alms-house, called God's house or hospital, for thirteen poor men who were to pray for the good estate of Richard Whittington, and of Alice his wife, their founders; and for Sir Wm. Whittington, knight, and Dame Joan his wife; and for Hugh Fitzwarren and Dame Malde his wife, the fathers and mothers of the said Richard Whittington and Alice his wife; and besides this testimony, in the church at Pauntley on the family estate in Gloucestershire, are emblazoned the arms of Whittington impaling Warren.

But the story gives no record of his honorable life, nor any account of the good deeds he performed for the benefit of the poor, for the education and enlightenment of his fellow citizens, or for the glory and renown of the old city that honored him. He held his wealth at the disposal of his king and his country, and showed he had a proper appreciation of it, by endeavoring to do what good he could with it. Remember, he lived in the fourteenth century, in the Dark Ages, so

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called; some of our rich men in the nineteenth century have not learned the true power of wealth as well as he knew it, and not as often as we should, do we find them erecting lasting monuments to religion, education and charity — monuments that would cause them to be held in everlasting remembrance. With the church of St. Michael, in Paternoster Royal, his name is inseparably connected, for it was there he founded his magnificent college with its master, four fellows, masters of arts, clerks, conducts and choristers; and bestowed on it the rights and profits of the church which belonged to him. This college, called God's House by his executors, was founded by him in 1421, "for perpetual sustentation of needy and poor people;" and I believe this is the first establishment of a home for the aged poor. It is now under the control and management of the Mercers' Company, of which company Whittington was a member. The principal is a person in holy orders called the tutor, whose duty it is to perform service in the chapel, and to "oversee the husbandry of the house and nourish charity and peace among his fellows." Each poor person admitted is to be one "meek of spirit, destitute of temporal goods in other places, by which he might competently live, and chaste and of good conversation." The inmates must be single persons above fifty-five, not having freehold property to the amount of £20, or other property to the amount of £30 a year. They receive from the funds of the college a yearly stipend of £30, besides enjoying some money gifts, and the advantages of medical attendance and the assistance of nurses. This charity, four hundred years after Whittington founded it, erected a handsome stone building, at an expense of £17,000, and its annual income thirty years ago was nearly £5,000.

He was the founder of the large manuscript library, which, in the reign of Edward Sixth, was in the chapel, called the Lord Mayor's Chapel, adjoining Guildhall; and he laid the first stone of a new library building attached to the church and house of the Gray Friars, near the spot where Christ Church hospital now stands. The total expenses of this building amounted to £556 16s. 8d, and of that sum Whittington contributed £400. In this London monastery there appears to have been the most considerable collection of books in the city, and one of its treasures was a transcript of the works of Nicholas de Lira, which was chained in the library. This book was one of Whittington's gifts, purchased at a cost of more than $300. During his third mayoralty, he entertained at Guildhall King Henry the Fifth and his bride Catharine of France. The king had just before been victorious at Agincourt, and that victory and the others which followed it brought about

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this alliance, which was to give the crown of France to Henry and his heirs, on the death of the present French king. The war had been expensive, but the loyal Englishman forgot all that, when he considered the glory of the crown, and the honor due to the king, who had knighted him. Guildhall exhibited all its magnificence; precious stones reflected the light from the chandeliers; choruses of beautiful females sung the praises of the victorious sovereign; wine flowed down the conduits instead of water; the tables were loaded with the choicest fish, most delicate meats and rare confections. The king was amazed and delighted. "Surely," said he, "never had prince such a subject; even the fires are filled with perfumes." "I will make these fires still more grateful," said Sir Richard, "if your highness inhibit me not." The king nodded his assent, and Whittington, advancing to the fire, drew forth a packet of bonds and placing them in the flames, he said: "Thus do I acquit your highness of a debt of £60,000!"

Says Richard Grafton, one of the old antiquaries of London:

"This year (1406), a worthy citizen of London, named Richard Whittington, mercer and alderman, was elected mayor of the said city, and bore that office three times. This worshipful man so bestowed his goods and substance to the honor of God, to the relief of the poor, and to the benefit of the common weal, that he hath right well deserved to be registered in the book of fame. First, he erected one house or church in London to be a house of prayer, and named the same after his own name, Whittington College, and so it remaineth to this day. And in the said church besides certain priests and clerks, he placed a number of poor aged men and women, and builded for them houses and lodgings, and allowed unto them wood, coal, cloth and weekly money, to their great relief and comfort. This man, also at his own cost, builded the gate of London, called Newgate, in the year of our Lord 1422, which before was a most ugly and loathsome prison. He also builded more than half of St. Bartholomew's Hospital, in West Smithfield, in London. Also he builded, of hard stone, the beautiful library in the Grey Friars, in London, now called Christ's Hospital, standing in the north part of the cloister thereof, where in the walls his arms is graven in stone. He also builded for the ease of the mayor of London and his brethren, and of the worshipful citizens, at the solemn days of their assembly, a chapel adjoining to the Guildhall, to the intent they should ever before they entered into any of their affairs, first to go into the chapel to call upon God for his assistance. And in the end, joining on the south side of the said chapel, he builded for the city a library of stone, for the custody of their records and other books. He also builded a great part of the east end of Guildhall, besides many other good works that I know not. But among all other I will show unto you one very notable, which I received credibly by a writing of his own hand, which also he willed to be fixed as a schedule to his last will and testament, the contents whereof was, that he willed and

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commanded his executors, as they would answer before God at the day of the resurrection of all flesh, that if they found any debtor of his, that ought to him any money, that if he were not in their consciences well worth three times as much, and also out of the debt of other men, and well able to pay, that then they should never demand it, for he clearly forgave it, and that they should put no man in suit for any debt due to him. Look upon this, ye aldermen, for it is a glorious glass."

Ah! good master Grafton, there be few aldermen that prepare themselves for the discharge of their official duties, in the way you have pointed out; and there be still fewer, aldermen or citizens, that would ever look into the glass you hold up before them.

From this account of Whittington's good deeds it would be no wonder if Englishmen should cherish his memory lovingly, and so they do; but the curious part of it is, that it is the mythical or legendary portion of his history that has been preserved and has come down to us, while the true facts of his life are even now being slowly gathered together, and still are difficult to obtain.

Look at the history connected with the stone on which he sat while listening to the Bow Bells of Chepe. The original stone is said to have been placed in Highgate Hill by himself, and it had a pavement around it eighteen feet in circumference. This stone remained as he placed it until 1795, when one S—— (history does not tell us what his name was; it only gives us the first letter, but he was the parish clerk at Islington) had the stone removed and sawed in two, and placed the halves on each side of Queen's Head Lane, in the lower street of that town. He tore up the pavement around the stone, and with it paved the yard of the Blue Last public-house, now the Marlborough Head, Islington. That disposed of the first and original stone. But another stone of smaller dimensions was immediately erected on the same spot and on it was inscribed "Whittington's Stone;" and, strange to say, it was never known by whose order or at whose expense it was done. This second stone, in point of fact, was three stones — two stones being used as bases to keep the Whittington stone upright. These remained until May, 1821, when they were removed by order of the church wardens of St. Mary Islington, and we find that it cost them £10 13s. 8d to do it, but we are not told why it was done; then the trustees of the parish ways erected a third stone, but in a different place. This was removed in 1854, and a tavern erected where it stood. Whether the turning point in Whittington's life remained unrecorded until 1869, I cannot say, although it is likely; but in that year, Mr. Richard Perkins, proprietor of the Whittington Stone Tavern, at an expense of £40, re-

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faced the old stone, inclosed it in an oval plinth, surrounded it with an iron railing, supporting a very handsome lamp, and inscribed on it "Whittington Stone," with the years of his service as Lord Mayor and Sheriff, and added the following: "This stone was restored, the railing fixed, and lamp erected, at the sole expense of R. Perkins, 1869." So, now, Whittington and Mr. R. Perkins will go down to posterity together. Now, despite this record of the stone, which goes back long before 1795, it is very doubtful whether Whittington sat on a stone at all. For from the ancient deeds that have been found, it appears that on that part of Highgate Hill there stood in ancient times a Lazar house or hospital for leprous persons; and from an old view of the place which has been preserved, it would seem that the stone was a part of a wayside cross in front of the chapel of St. Anthony, erected for the purpose of attracting the notice of the passing traveler, to the unhappy victims of disease in the hospital, and as a means of soliciting his alms and his prayers for the unfortunate. Such a cross would, of course, be very old, but it would be long after the time when Whittington flourished. But the story is stronger than historical facts, and thanks to Mr. Perkins' liberality, the story seems destined to outlive them.

But I do not believe the story would have lived for a generation had it not been for the part the cat has taken in it. Puss seems to have been the foundation of the whole tale, and had she been left out, his good deeds, his munificent charities, and his high honors would all have been forgotten. That prince of old gossips, Pepys, tells us, that he went "to Southwarke fair, and there saw the puppet show of Whittington, which was pretty to see; and how that idle thing do work upon people that see it, and even myself, too!" Honest old Samuel; but we cannot believe that the puppet show could have worked upon him very greatly, or that the play could have been a stock piece of Punch and his dramatic troupe for more than a century, if the cat had not been one of the principal performers. Early in the reign of James I., Reginald Elstracke published a very fine engraving of Whittington, in which he was represented with his hand resting on a skull. There was no sale for it, no one wanted it; his great and generous deeds failed to create a market for it. So one Peter Stint, a print-seller of Pye Corner in London, purchased the plate, and having a proper appreciation for the Englishman's love of the legend, and also a keen eye for business, erased the skull and engraved a cat in its place; and he had no difficulty then in disposing of all the copies he printed.

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At Mercers' Hall, to which company Whittington belonged, there is a portrait on canvas of a man of about sixty years of age, dressed in a fine livery gown and black cap of the time of Henry VIII. It is about a half length portrait, and on the left hand of the figure is a black and white cat, whose right ear reaches up to the band, or broad turning down of the skirt of the figure, and in the left-hand upper corner of the canvas is painted "R. Whittington, 1536." The innkeepers of England, who, I think, can bear off the palm for curious signs, early adopted this one, and the Lord Mayor and his feline friend in many places invited the weary traveler to the ease that an inn affords; while one ambitious innkeeper outstripped all others in this particular line, by exhibiting, in the window of his public house on the Highgate Road, the skeleton of a cat, which the good people who visit the place firmly believe to be the mortal remains of Whittington's early friend. Now, all this is more curious, when we know that the story of a cat being the source of a man's wealth, is not an English story at all; but that long before Whittington was born, such stories were current in Tuscany, Persia, Denmark and other countries. It is *possible*, of course, that the heroes of all these stories had cats, and got wealth by them, as Whittington is said to have done, but it is not likely; and when we come to read these stories, we find such a striking resemblance between them and that of our hero, that we are forced to believe that they must have been transmitted from one country to another in some way. You can only judge of the similarity of these stories by permitting me to relate some of them; and the first one we shall take comes from Persia.

In the 700th year of the Hejira (A. D., 1300), in the town of Siraf, lived an old woman with her three sons, who, turning out profligates, spent their own patrimony and their mother's fortune; and abandoning her, went to live at Kais. A little while after, a Siraf merchant undertook a trading voyage to India, and freighted a ship. It was the custom of these days, that when a man undertook a voyage to a distant land, each of his friends intrusted to his care some article of property, and received its produce on his return. The old woman, who was a friend of the merchant, complained that her sons had left her so destitute that except a cat, she had nothing to send as an adventure, which yet she requested him to take. On arriving in India he waited upon the king of the country, who, having granted him permission to trade with his subjects, also invited him to dine. The merchant was surprised to see the beards of the King and his courtiers encased in golden tubes; and the more so, when he ob-

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served that every man had a stick in his hand. His surprise still increased, when, upon the turning up of the dishes, he saw swarms of mice sally out from the wall, and make such an attack upon the victuals as to require the greatest vigilance of the guests in keeping them off with their sticks. This extraordinary scene brought the cat of the old woman of Siraf into the merchant's mind. When he dined a second time with the king he put the cat under his arm, and no sooner did the mice appear than he let it go, and to the delight of the king and his courtiers, hundreds of mice were laid dead about the floor. The king, of course, longed to possess so valuable an animal, and the merchant agreed to give it up, provided an adequate compensation were made to its real owner. When the merchant was about his departure, he was shown a ship finely equipped, laden with all sorts of merchandise, which he was told was to be given to the old woman for her cat. She, of course, could scarcely yield credit to his tale, but when she found that he was in earnest, and that she was possessed of such vast wealth, she imparted her good fortune to her sons, who came over to her, and after having made merry with the ready money, embarked with their mother and the rest of the property, and established themselves at Kais. Here they traded with great success, until their name became so famous that twelve ships all at one time were consigned to them. They managed by stratagem to make away with the owners of these ships, seized their property, and commenced to be pirates. In this new character they were again successful, and became so powerful that they braved the king of the country, who was too weak to destroy them. In the course of time, indeed, their descendants became the kings of Kais, and are known in Persian history under the name of Beni Kaiser. At length their power was destroyed by Atta Beg, then king of Fars; and since then, their possessions have been annexed to the Persian dominions. This is the legend of Persia, current before Whittington was born.

Italy furnishes us with another story, told by Count Lorenzo Magalotti, a Florentine nobleman, who flourished in the latter part of the 17th century; the story, however, is no invention of his own, but an old legend current many years in Italy, and it is as follows:

"You must know that at the time our Amerigo Vespucci discovered the new world, there was in our city (Florence) a merchant whose name was Messer Ansaldo degli Ormanni, who, though he was very rich, being, perhaps, desirous of doubling his wealth, freighted a large ship, and began to sell his merchandise in the newly-discovered parts of the west. And having made two or three good voyages thither, and gained immensely in his dealings, he determined to return there

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for the fourth time. But scarcely had he departed from Cadiz, when a most furious tempest arose, and he ran for several days without knowing whither he should go. Fortune, however, was so kind to him, that she brought him to an island named Canary. He had scarcely anchored, when the king of the island, hearing of the arrival of a vessel, came down to the port with all his barons; and having given Messer Ansaldo a most gracious reception, to let him see how agreeable his arrival was to him, insisted on taking him with him to the royal residence. Here, the tables being spread in the most sumptuous manner, he sat down along with Messer Ansaldo, who, seeing several of the young men who waited on the king holding in their hands great long rods, like those carried by the Penitents, wondered very much; but as soon as the dishes were brought up he saw at once what was the cause of this mode of attendance, for the mice that came from all sides and attacked these delicate meats were so large and so numerous that it was quite wonderful. The young men then bestirred themselves, and used their rods vigorously to defend from them the dish off which the king and Messer Ansaldo were eating. Ansaldo, when he had heard, and in some sort also seen, that the multitude of these nasty animals was numberless in that island, and that no way had ever been discovered of destroying them, endeavored by signs to let the king know that he would give him a remedy which would clear the country completely of such animals. So he ran down to his vessel, took two remarkably fine cats, a male and a female, and bringing them to the king, made the tables be covered once more. Scarcely had the odor of the victuals began to diffuse itself, when the usual procession made its appearance; which, when the cats saw, they began to skirmish away so nobly that in a very short time they had made a glorious slaughter among them. The king rejoiced beyond measure at what he saw, and wishing to recompense the courtesy of Messer Ansaldo, ordered several nets of pearls, and abundance of gold and silver and other precious stones to be brought to him, and he presented them to Messer Ansaldo, who thinking that he had now made sufficient profit of his merchandise without going to dispose of it in the west, spread his sails to the wind, and returned home as rich as he need be."

Stories similar to these are found in Tuscany and Denmark, while Venice furnishes us one which is connected with the origin of that city, and was an old story one hundred years and more before Whittington was born. Indeed, it is generally conceded that the story did not make its appearance in England until about the reign of Elizabeth, about a century and a half after Whittington was in his grave. One of the earliest allusions to the story that we have, is in the play of Eastward Hoe, made (as the old edition has it) by Geo. Chapman, Ben Jonson and John Marston, and played in the Black Friars by the children of her Majesty's Revels. In this play, Touchstone had given his daughter in marriage to his apprentice,

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Goulding, releasing him from his indenture before his marriage. On the first day of his freedom, Goulding was taken into the livery of his company, and afterward appointed deputy to the alderman of his ward. Relating his advancement to his father-in-law, Touchstone says: "I hope to see thee one of the monuments of our city, and reckoned among her worthies, to be remembered the same day with the Lady Ramsey and grave Gresham, when the famous fable of Whittington and his puss shall be forgotten, and thou and thy acts shall become the posies for hospitals; when thy name shall be written upon conduits, and thy deeds played in thy life-time, by the best companies of actors, and be called their get-penie." This play was written in 1603.

In an old play called "If you know not me you know nobodie, or the Troubles of Queen Elizabeth," by Thomas Heywood, 1609, we have the following dialogue between Nowell and Hobson:

Nowell—"This Sir Richard Whittington three times Maior,
Sonne to a Knight and prentice to a Mercer,
Began the librarie to Grey Friars in London;
And his executors after him did build
Whittington College, thirteen Almes Houses for Poore Men,
Repaired St. Bartholomew's in Smithfield,
Glased the Guildhall and built Newgate."

Hobson—"Bones of me! then I have heard lies;
For I have heard he was a scullion,
And raised himself by venture of a cat."

Nowell—"They did the more wrong to the gentleman."

In the "Induction," as it is called, to Beaumont and Fletcher's comedy of the "Knight of the Burning Pestle" (A. D. 1613), the speaker of the prologue is interrupted by a citizen, who commands him to stop, as the play is intended to abuse the citizens, and asks him: "Why could you not be contented as well as others, with the legend of Whittington, or the life and death of Sir Thomas Gresham with the building of the Royal Exchange? Or the story of Queen Eleanor, with the rearing of London Bridge upon woolsacks?" And the earliest notice of the song, "Turn Again, Whittington," is in "Shirley's Constant Maid" (1640), where the niece says:

"Faith, how many churches do you mean to build
Before you die? Six bells in every steeple,
And let them all go to the City tune,
'Turn again, Whittington'—who, they say,
Grew rich, and let his land out for nine lives,
'Cause all came in by a cat."

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But I think, perhaps, the earliest notice of the story is in Richard Johnson's "Crown Garland of Golden Roses." Johnson was a ballad and prose romance writer at the end of the 16th and beginning of the 17th century, and it is not known in what year he was born, or when he died. The first edition of his "Garland" was published in 1612, and the ballads in this collection were written at an earlier period than the date of their publication in the form of a "Garland." The ballad is entitled "A Song of Sir Richard Whittington, who, by strange fortunes, came to be thrice Lord Maior of London; with his bountifull guifts and liberality given to this honourable Citty," to be sung to the tune of "Dainty Come Thou to Me," and is as follows:

Here must I tell the praise
Of worthy Whittington;
Known to be in his dayes
Thrice Maior of London.
But of poor parentage
Borne was he, as we heare;
And in his tender age
Bred up in Lancashire.

Poorely to London than
Came up this simple lad,
Where with a marchant man
Soone he a dwelling had;
And in a kitchen plast
A scullion for to be,
Whereas long time he past
In labour drudgingly.

His daily service was
Turning spitts at the fire,
And to scour pots of brass
For a poore scullion's hire.
Meat and drinke all his pay,
Of coyne he had no store,
Therefore to run away
In secret thought he bore.

So from this marchant man
Whittington secretly
Towards his country ran,
To purchase liberty.
But as he went along
In a fair summer morne,
London's bells sweetly rung,
"Whittington back return."

Evermore sounding so
"Turn againe Whittington,
For thou in time shall grow
Lord Maior of London."
Whereupon back againe
Whittington came with speed,
A prentise to remain
As the Lord had decreed.

"Still blessed be the bells,"
This was his daily song,
"They my good fortune tells,
Most sweetly have they rung.
If God so favour me,
I will not proove unkind,
London my love shall see,
And my great bounties find."

But see his happy chance;
This scullion had a cat,
Which did his state advance,
And by it wealth he gat.

His maister ventred forth,
To a land far unknowne,
With marchandise of worth
As is in stories showne.

Whittington had no more
But his poore cat as than,
Which to the ship he bore,
Like a brave marchant man.
Vent'ring the same, quoth he,
I may get store of golde,
And Maior of London be,
As the bells have me told.

Whittington's marchandise
Carried was to a land
Troubled with rats and mice,
As they did understand.
The king of that country, there
As he at dinner sat,
Daily remained in fear
Of many a mouse and rat,

Meat that in trenchers lay
No way they could keepe safe,
But by rats borne away,
Fearing no wand or staffe.
Whereupon soone they brought
Whittington's nimble cat,
Which by the king was bought
Heapes of gold giv'n for that.

Home againe came these men
With their ships loaden so,
Whittington's wealth began
By this cat thus to grow.
Scullion's life he forsooke
To be a marchant good,
And soon began to looke
How well his credit stood.

After that he was chose
Shriefe of the citty heere,
And then full quickly rise
Higher, as did appeare.
For to this cities praise,
Sir Richard Whittington
Came to be in his dayes
Thrise Maior of London.

More his fame to advance
Thousands he lent his king,
To maintaine warres in France,
Glory from thence to bring.
And after at a feast
Which he the king did make.
He burnt the bonds all in jeast,
And would no money take.

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Ten thousand pound he gave
To his prince willingly,
And would not one penny have,
This in kind curtesie.
God did thus make him great
So would he daily see,
Poore people fed with meat
To show his charity.

Prisoners poore cherished were,
Widdowes sweet comfort found,
Good deeds both far and neere,
Of him do still resound.
Whittington Colledge is
One of his charities;
Records reporteth this
To lasting memories.

New Gate he builded faire
For prisoners to live in;
Christ's Church he did repaire,
Christian love for to win.
Many more such like deedes
Were done by Whittington,
Which joy and comfort breedes
To such as looke thereon.

Lancashire then hast bred
This flower of charity;
Though he be gon and dead,
Yet lives he lastingly.
Those bells that called him so,
"Turne again Whittington,"
Call you back many moe
To live so in London.*

From the registers of the Stationers' Company in London it appears that on the 8th day of February, 1604–5, Thomas Pavier entered "The history of Richard Whittington, of his lowe birthe, his great fortunes as yt was plaied by the Prince's Servants." This is the earliest printed account of the story of which we have a certain date, and it was followed on the 6th of July, 1605, by a ballad, entered by Joseph Wright, called "The wondrous life and memorable death of Sir Richard Whittington, now sometime Lord Maior of the Honorable City of London."

All these illustrations go to show that the story was invented some time in the reign of Elizabeth, as we find no record of it at an earlier date; and we are met at once by the question, how did the story come to be told of Whittington at all? That is a hard question to answer; but there's a harder one. Did he have a cat? And this question has been a puzzler to scientific and antiquarian societies. The London Antiquarian Society had a discussion on this point, but did not settle it. "Mr. Pegge," it is said, "gave us the history of Whittington, but could make nothing at all of his cat, although she is his constant companion in all statues and pictures." And Horace Walpole, angry at the society because of their publication of Master's reply to his historic doubts, says in one of his letters: "I choose to be at liberty to say what I think of the learned society, and, therefore, I have taken leave of them, having so good an occasion presented as their council on Whittington and his cat, and the ridicule that Foote has thrown on them."

Foote did indeed do his best to ridicule the society, and the account of it is not only amusing but pertinent to this matter we are discussing, too. His satire on the society is found in the comedy of "The

*Harper's Magazine for December, 1879, published a *fac simile* of a ballad entitled "London's Glory and Whittington's Renown; or a Looking-Glass for Citizens of London." This ballad is found among the Rexburghe ballads (III, 58), and the conjectured date of its publication is 1641. It is, however, substantially Johnson's earlier ballad, with the addition of the 1st verse and the 18th verse, and other changes of words and lines throughout the whole ballad.

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Nabob," which was produced at the Theatre Royal Haymarket in 1772. Sir Matthew Mite, the hero of the comedy, was the son of a cheesemonger, and was sent beyond the seas to escape the punishment of some youthful indiscretion. While there he accumulated great wealth, and on his return home he lived in profligacy. Among the other honors that were heaped upon him, notwithstanding his low life, was his election to be a member of the Antiquarian Society, and one of the rules of the society was, that every member elected should produce proofs of his antique erudition, and should deliver an inauguration speech. To prove that he has made the necessary antiquarian researches, he attends the meeting preceded by four black servants, one bearing an illegible manuscript in Latin, containing the twelve books of Livy, supposed to have been lost; another bearing a sarcophagus or porcelain urn, dug from the Temple of Concord, and supposed to have held the dust of Marc Antony's coachman; another, a large piece of lava thrown from the Vesuvian volcano at the last great eruption, by a chemical analysis of which, and by properly preparing it, it will be no difficult task to propagate burning mountains in England, if encouraged by premiums; and a fourth containing a box bearing petrifactions, bones, beetles and butterflies. These proofs of antiquarian research being considered sufficient, he proceeds to deliver his inaugural address, taking for his subject Whittington and his cat. "The point I mean to clear up," he says, "is an error crept into the life of that illustrious magistrate, the great Whittington, and his no less eminent cat; and in this disquisition four material points are in question. 1st. Did Whittington ever exist? 2d. Was Whittington Lord Mayor of London? 3d. Was he really possessed of a cat? 4th. Was that cat the source of his wealth? That Whittington lived no doubt can be made; that he was Lord Mayor of London is equally true; but as to his cat, that, gentlemen, is the Gordian knot to untie. And here, gentlemen, be it permitted me to define what a cat is. A cat is a domestic whiskered four-footed animal, whose employment is catching of mice; but let puss have been ever so subtle, let puss have been ever so successful, to what could puss's captures amount? No tanner can curry the skin of a mouse, no family make a meal of the meat; consequently no cat could give Whittington his wealth. From whence then does this error proceed? Be that my case to point out. The commerce this worthy merchant carried on was chiefly confined to our coasts; for this purpose he constructed a vessel which, for its agility and lightness, he aptly christened a cat. Nay, to this our day, gentlemen, all our coals from Newcastle are imported in nothing

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but cats. From thence it appears that it was not the whiskered four-footed mouse-killing cat that was the source of the magistrate's wealth, but the coasting, sailing, coal-carrying cat; that, gentlemen, was Whittington's cat."

But Foote's solution of the problem, ingenious though it is, has not been considered as settling the matter entirely, and a controversy has arisen on the point which, like many controversies in which neither party has any positive knowledge on the subject, has left the disputants of the same opinion that they were when they began the wordy warfare. On the one hand it is argued that the story of Whittington getting his wealth by a cat is a pure fiction; that as he was born before the year 1360, the year in which his father died, and was Lord Mayor the first time in 1397, and as the cat voyage occurred when he was a lad, it must have happened about the year 1375, when he was about fifteen years old. Now the story lays the scene of the cat adventure on the west coast of Africa, and during the whole of Whittington's life-time that coast was as nearly unknown to Europe as the coast of America, for the Portuguese did not begin exploring it until the fifteenth century, not in fact until after the death of Whittington, in whose time the most distant voyages of English ships could only have been to the Baltic, or the Mediterranean, on the shores of which cats were as well known and as plentiful as in England.

This appears to be a pretty strong line of argument, but not strong enough to convince an antiquary who had made up his mind otherwise; so forgotten books of travel are unearthed, old encyclopedias are ransacked and all the facts and hints are gathered together, and it is shown that the African shores were visited by the English — not continuously, perhaps, but enough to say they were there — at the time Whittington is said to have sent his cat there. And more than that, there was great need that the cat should be sent there, for even as late as 1732, one Jean Barbat testifies of the enormous quantity of rats that were there, and that the cats were imported from Europe. And besides, the cat *was* able to be the source of his wealth, for cats brought enormous prices in countries so troubled with rats.

Two cats were taken out as a speculation to Cuyaba in Brazil, where there was a plague of rats, and they sold for a pound of gold; their kittens brought each thirty pieces of eight, or over thirty dollars in our money. The next generation brought about twenty dollars a piece, and so the price gradually fell as the supply increased; and the elder Amalgro is said to have given 600 pieces of eight, or $675, to the person who presented him with the first cat which was brought from

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South America. And the same thing is shown in the early history of Britain; for cats were then held in so great estimation that their preservation was considered of the utmost importance, and in the reign of Howel the Good, a Cambrian prince, who died A. D. 948, special laws were made to fix the price of different animals, and among them the cat was included on account of its scarcity and utility. The price of a kitten before it could see was fixed at one penny, till proof could be given of its having caught a mouse two pence, after which it was rated at four pence, and this was a great sum in those days. It was likewise required that the animal should be perfect in its senses of hearing and seeing, should be a good mouser, and have its claws whole. If any one should steal or kill the cat that guarded the prince's granary, the offender was to forfeit either a milch ewe, with her fleece and lamb, or as much wheat as when poured on the cat, suspended by its tail (its head touching the floor), would form a heap high enough to cover the tip of the tail.

And on such an array of facts as this the contestants for a literal interpretation of the story rest their case.

But neither of these views appears to me to be the correct one, for if there is no truth in the statement that Whittington got his wealth by a cat, how did it happen that his name was and is always associated with this animal; how did it happen to him rather than to some other man? There is always a history connected with such an association; something in the character, condition and circumstances of the man that makes it appropriate, or properly descriptive, or else it would not be. No man would have such a story attached to his name if there were no reason for it, and it is no matter how foolish a reason it may be. The other particulars of the story could easily be increased and enlarged upon by its transmission through so many centuries; but there must have been something that was the origin of the idea that he had a cat. To ask us to believe, as the literal interpreters do, that it was a veritable cat, seems to be asking too much when we call to mind the many similar stories of other men living in different countries and at different times; and I rather incline to the opinion expressed in sport by Foote, that Whittington obtained his wealth in the coal trade, and that it was the cat of the collier that gave rise to the story. There is no doubt that the boats that carried the coal to London were called cats, and Webster gives as one of the meanings of the word the following: "A strong-built ship from four to six hundred tons burden and employed in the coal trade." And the history of the use of coal in London agrees very curiously with the time that Whit-

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tington flourished. It was first made an article of commerce from the north to the metropolis in 1381, when Whittington was just of age. Previous to that time its use had been prohibited in London by a proclamation of Edward I., issued in 1306. And Prynne gives us the reason for the proclamation:

"When brewers, dyers and other artificers using great fires began to use sea coals instead of dry wood and charcoals in and near the city of London the prelates, nobles, commons, and other people of the realm, resorting thither to Parliament and upon other occasions, with the inhabitants of the city, Southwark, Wapping and East Smithfield, complained thereof twice, one after another, to the king, as a public nuisance, corrupting the air with its stink and smoke to the great prejudice and detriment of their health. Whereupon the king first prohibited the burning of sea coal by his proclamation, which being disobeyed by many for their private lucre, the king, upon their second complaint, issued a commission of oyer and terminer to inquire of all such who burned sea coals against his proclamation within the city, or parts adjoining to it, and to punish them for their first offense by great fines and ransoms, and for their second offense to demolish their furnaces and kilns wherein they burnt sea coals, and to see his proclamation strictly observed for times to come."

Dr. Bachoffner in a lecture before the Royal Polytechnic Institution mentions the fact that three separate proclamations were issued against the burning of coal, and that it was at last made a capital offense, and a man was actually accused, tried, condemned and put to death for burning coal within the metropolis. Such a statement as this seems almost incredible, and although no record has been found of any conviction or execution for such an offense, still we can hardly suppose that it would have been made before such a society without some ground for it. At any rate, these facts show that there was a great source of wealth in the coal trade in those early days, or men would not have been so willing to disobey the royal command; and all restrictions being removed in Whittington's early manhood, he may have laid the foundation of his wealth with this kind of a cat.

Again, it is a common thing in the English language for one word to be substituted for another, when both words sound alike, but mean different things; so that it would be no difficult matter to invent the whole story of the cat, the pussy, when there was no other foundation for it than the cat, the coal boat. One example will show this.

In King Lear, Edgar, disguised as a madman, tells Gloster what he eats and drinks and how he suffers, and closes with the well-known couplet—

> "But mice and rats and such small deer
> Have been Tom's food for seven long year."

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We do not see why mice and rats should be called "deer;" but the difficulty vanishes when we remember that Shakespeare undoubtedly used originally the Anglo-Saxon word "*deor*," which means "beasts;" and Tom meant "mice and rats and such small beasts" had been his food for seven long year, and the word being the same in sound as our English word for a special beast, the meaning of the couplet has been somewhat obscured. But I am not so strenuous in support of this theory of the story as to seek a quarrel with any who do not agree with me. If you prefer that your childhood remembrances should not be disturbed, consider a veritable cat as the hero of the story; there are many who will agree with you, and these early recollections are the most sacred we have. As Martin Luther said: "I would not for any quantity of gold part with the wonderful tales which I have retained from my earliest childhood, or have met with in my progress through life;" and with such testimony as that, you do well to cherish them, and let no words of mine cause you to depreciate the value of your treasure.

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AN ACCOUNT OF THE MANUSCRIPTS OF GEN. DEARBORN AS MASSACHUSETTS COMMISSIONER IN 1838 AND 1839, FOR THE SALE OF THE SENECA INDIAN LANDS.

By Henry A. Homes, LL.D.

[Read before the Albany Institute, October 12, 1880.]

At a sale at auction, in Boston, in October, 1878, of books and manuscripts from the library of J. W. Thornton, one of the titles in the catalogue, describing the articles offered for sale, read as follows:

"Journal of a Mission as Commissioner from the State of Massachusetts to the Seneca and Tuscarora Indians; and an account of the treaties held with those tribes, in the years 1838 and 1839, for the sale of their lands, and for their emigration west of the Mississippi. By H. A. S. Dearborn, Superintendent of Massachusetts. In 3 vols. 4to."

It was thought that these volumes might be worth securing for our State Library. I wrote to Hon. Lewis H. Morgan of Rochester, to obtain his opinion as to their probable value. You are all well aware of Mr. Morgan's extensive acquaintance with New York Indian History. His well-known volume, "The League of the Iroquois," gives their history, religion and customs with a touching eloquence. In answer, he referred me for explanation to a passage in this volume. From this extract, and from the manuscripts themselves, I learned that they referred to a treaty of the United States with the Seneca and Tuscarora Indians in the extreme western part of this State, whereby 119,000 acres of their lands were to be sold, and they were to emigrate to Green Bay, Michigan. But the measures by which the treaty with the Indians had been secured were represented to have been tainted with so much corruption and fraud, there was so much opposition on the part of the Indians themselves to emigrating, they were supported in their opposition by so many friends, especially by the Society of Friends, that the purchasers, the Ogden Land Company, finally made a compromise, and yielded up to them more than half of the land which they had purchased.

This transaction was painted by Mr. Morgan, in the passage to which he referred me, in very sombre colors. I quote a portion of it as illustrative of the nature and importance of the subject:

"The darkest frauds, the basest bribery, and the most execrable intrigues which soulless avarice could suggest have been practiced in

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open day, upon this defenseless and much-injured people. The natural feelings of man and the sense of public justice are violated and appalled at the narration of their proceedings. * * * The Georgia treaty with the Cherokees, so justly held up to execration, is a white page compared with the treaties of 1838 and 1842, which were forced upon the Senecas. This project has already, however, in part, been defeated by the load of iniquity which hung upon the skirts of these treaties."*

In another passage, in the same volume, he remarks:

"The (United States) government bartered away its integrity to minister to the rapacious demands of the Ogden Land Company."†

The author is an adopted member of the Seneca tribe.

In view of this and similar declarations, I concluded that it was certainly for the interest of the State, that in a transaction where the good name of the United States, of Massachusetts and of New York, were all more or less implicated, the original documents belonging to one of the chief parties to the transaction, the State of Massachusetts, should enter into the *possession* of the State of New York. And accordingly, the three volumes, of about 1,100 pages of manuscript, letter-sheet size, were purchased at the auction for about twenty dollars each. On examination, I found them to be a valuable addition to the historical records of the State, and well worthy of being preserved for reference.

Before describing the *MSS.*, let me very briefly mention a few of the antecedent historical facts regarding our relations with these Indians, for the sake of some of the younger members in the audience, who may not be familiar with them. Massachusetts and New York, under their original powers from Great Britain, claimed jurisdiction from their western boundaries to the Pacific ocean. This interfering claim of Massachusetts was settled by an agreement or contract of that State with New York, December 16, 1786, at Hartford, Conn., by which the territorial jurisdiction of New York was acknowledged, while Massachusetts only retained the right to buy the 4,000,000 acres which she claimed, from the Indians, at such times as they were willing to sell. This pre-emptive right was one which Massachusetts could dispose of in portions to other parties. The first great sale was made to Messrs. Phelps & Gorham, in 1788, and next in time, 1,250,000 acres to Robert Morris, the great financier, the nation's great benefactor, in 1791. He formed the Holland Land Company to facilitate the sale of the land. It was this purchase which brought upon Morris those financial embarrassments which could and did

*Morgan's League of the Iroquois, Roch., 1851, p. 83. †The same, p. 458.

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confine him for three long years in a debtor's prison, uttering bitter words against some of his creditors; and the country was too poor to relieve him.

It was after the Big Tree Treaty at Geneseo, in 1797, (of which treaty there is an official copy in the State Library), a treaty in which Robert Morris and Thomas Morris, his son, participated, that the Indians ceded the title to a large portion of their lands. In view of his embarrassments, Morris organized the North American Land Company, in which Nicholson and Greenleaf were partners. He accused the latter of cheating him, and of being the occasion of his becoming the inmate of a prison.*

The Indians after that treaty were gradually in the extreme western part of the State disposing of their lands to eager purchasers. At last, the invasion of a white population all around the four reservations of Allegany, Buffalo, Cattaraugus and Tonawanda, which contained in all only about 119,000, of an original 6,000,000 acres, excited the earnest desire of those who had purchased the pre-emptive right from Massachusetts, now called the Ogden Company, and who were the successors of Robert Morris and his associates, to enter into possession of these Indian lands by purchase. In their general aim, they were sustained by the policy of the United States. President Van Buren, in a message to Congress, in December 1837, urged the removal of these Indians, declaring that it had been the "fixed policy of the government from the days of the administration of Jefferson, in 1804, to remove the Indians west of the Mississippi;" and in his special message of January 14, 1840, he states that 40,000 Indians had been removed there since 1837 from different States.†

In 1838 a law of the United States for carrying into effect a treaty which had been adopted by the Senate for the emigration of the New York Indians, was amended, the treaty not having been accepted by the Senecas. In the summer of this year, the Ogden Company notified the Governor of Massachusetts, Mr. Everett, that a council was to be held at Buffalo Reservation with the Indians, for the acceptance of this treaty, whereby that company would become the purchaser of the Indian title, and asked that Massachusetts should be present by her superintendent, according to the terms of the agreement with New York in 1786, and meet the United States commissioner to protect her own rights and those of the Indians.

*Doty's Livingston's County History. 8vo. 1876.

†This message will not be found in Williams' Statesman's Manual; but was a special message and must be sought for only in the journals of the Senate.

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Governor Everett appointed, as such superintendent, Gen. Henry A. S. Dearborn. He was son of Gen. Henry Dearborn, who had been engaged in the battle of Bunker Hill, and in Sullivan's campaign in New York in 1779, had been Secretary of War from 1801 to 1809, and finally had held command in the war of 1812, chiefly on the frontier of the State of New York and Canada. His son the commissioner also had been a public servant during a large part of his life, had been Adjutant-General of the State of Massachusetts for ten years, from 1834 to 1843, and for five years was mayor of the city of Roxbury, from 1847 until his death in 1851. He was a man of large experience, of high honor and integrity.

He attached great importance to the functions which he discharged in 1838 and 1839 as Massachusetts commissioner at the Buffalo Creek council, to superintend the disposal of the Indian lands; and in his leisure hours in the following years he collected and personally arranged all his original manuscripts connected with this mission, and bound them into three quarto volumes of letter sheet size of about three hundred and sixty pages each.

Of these volumes, the first one contains eighteen original letters from Gov. Everett, chiefly to Gen. Dearborn, and eighteen letters chiefly to the Governor from Gen. Dearborn; the treaty with the several tribes; the official report to the Governor of his first mission commencing August, 1838, with an appendix of documents, embracing statements of the chiefs, Judge Stryker's statement, in all about one hundred and fifty pages; a second report of his second mission later in the same year, in November and December, with the documents, making about fifty pages; several letters from Mr. Ogden of the Ogden Company to Gen. Dearborn, and various other letters. I have not found either of these reports in print among the documents of the State of Massachusetts.

The second volume bears a title given by Gen. Dearborn, the same title which was given to all the three volumes in the printed catalogue of the MSS. as sold at the auction sale, and which we quoted at the beginning of this paper.

If the preceding reports are not sufficient to give us a clear view of the part taken by Massachusetts in a treaty which has been said to compromise both her honor and that of New York, we have in addition for testimony in this volume, three hundred and fifty-six pages filled with Gen. Dearborn's private "Journal of a Mission to the Senecas" as written down by him from day to day, containing all the occurrences from the hour of his departure until that of his

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return to Boston, names of the individuals with whom he conversed, and notes of his conversations with them.

The third volume contains a similar private journal of his second mission in November and December, 1838, of about one hundred pages; and also a journal of a tour to Cattaraugus on a branch of the same subject in 1839 to meet the Secretary of War, J. R. Poinsett. There are also bound up with these journals, letters from Ransom H. Gillet, the United States commissioner; from N. T. Strong, a Seneca chief; several from the Secretary of State of Massachusetts; many from Honnondeah, a chief, son of N. T. Strong; more letters from Gov. Everett, and from T. L. Ogden; and finally as cumulative testimony, that nothing might be wanting for the most thorough presentation of the whole case, and not the least light and shade be lacking to complete the picture, this last volume contains the identical letters which Gen. Dearborn mailed from day to day during his absence to Mrs. Dearborn, to the number of twenty-nine, covering eighty-seven pages. They bear the postmarks, and have apparently been preserved without diminution or erasure, and in them he speaks without reserve of the minutiæ of the affair in which he was engaged. The three volumes as a whole present every phase of the transactions in question, as they came before the Massachusetts commissioner.

The transactions treated of in these volumes did not awaken a national interest, like the removal of the Indians from Georgia in 1829, an event commemorated in volumes entitled *Speeches on the Indian Bill*, 1830, and *Essays on the Present Crisis, etc.*, signed William Penn, by the father of William M. Evarts, and published in 1829. Still they occasioned the printing of as many as fifteen pamphlets at least, by different parties, between the years 1840 and 1845, large extracts from some of which were published in England. Most of these emanated from those who represented the Indians as greatly wronged, especially from the yearly meetings of the Society of Friends. The substance of the complaint of these latter was, that the alleged treaty was fraudulent; that usage and the law of 1838 required that the consent of the chiefs should have been obtained in open council; but that after obtaining the consent of a small minority in open council, the United States commissioner had obtained the consent of the rest, singly, and not in council; that bribery had been freely used with individuals to secure their consent; that of the 2,000 Senecas not 150 were desirous of going west, counting men, women and children, and that all the

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remainder, including a majority of the chiefs, were determinedly opposed to leaving their homes.

It appeared that Mr. Gillet had informed the Indians that, under the amended treaty of 1838, he thought that if they should reject it they could none the less be compelled to go to the West. Gen. Dearborn, however, speaking in the name of the Governor of Massachusetts, assured them that they would not be compelled to go.*

But on the point of the necessity of securing the consent of the chiefs in open council, after the treaty had once been submitted to them there, and had been debated, it appears that the suggestion had proceeded from Gen. Dearborn himself to Mr. Gillet, that he would do well to call the chiefs, individually, to his room and confer with them there. The reason for his making this suggestion was, that he was persuaded that nearly all the violent opposition to the treaty proceeded from interested whites, who wished to have the Indians retained on their reservations, for the sake of mill privileges and lumber privileges for which they paid very little; or for some other motive of no greater significance, such as that the Indians were pecuniarily indebted to them. Gen. Dearborn observes in his journal, that if the same offers were made to any laboring whites which were made by the United States Government to these Indians, they were so liberal that men would abandon any homes to avail themselves of them.

He writes thus upon this branch of the subject:

"To reason with the ignorant, and attempt to do good to the prejudiced, suspicious and most debased of the human species, is to labor without results either gratifying to us or beneficial to them. Here has been a boon offered which would depopulate any country town in New England, and hurry them to the West with glad and grateful hearts; but the miserable savages are incapable of appreciating the generous humanity of the Government."

As evidence that the Indians were most bountifully dealt with by the United States, the following figures are presented by Gen. Dearborn as the money value of what was offered in exchange for the 119,000 acres of land by the parties interested. They were offered 1,824,000 acres of land at Green Bay, which, at $1.25 an acre, was worth $2,280,000. The amount to be given them in money was $433,500; the amount to be paid them by the Ogden Company was $211,600; the amount for exploration of the new territory was $16,000. This made a total sum of about $3,000,000 to the two tribes.†

* Dearborn MSS. II, 07, 98, 99.

† Dearborn MSS., 112, 126.

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On January 14, 1840, President Van Buren sent the treaty thus tainted with allegations of fraud, with a special message of six pages on the subject, to the Senate. (It will not be found in the collection of his messages in Williams' Statesman's Manual, but must be sought for in the journals of the Senate.) He speaks in favor of the general proposition of the removal of the Indians, but declares that in his opinion the signatures had been fraudulently obtained, and that therefore the treaty ought not to be ratified. The question was debated on eleven different days in the Senate; and finally, after the failure of many proposed resolutions from Tallmadge, Clay, Preston, Porter and others, the vote stood nineteen to nineteen, and the treaty was only ratified by the casting vote of R. M. Johnson, the Vice-President, in the affirmative. The New York Senators, Messrs. Tallmadge and Wright, voted in the affirmative. The differences of opinion were not on party lines, though Mr. Clay voted in the negative. Mr. Sevier in 1840 presented a memorial of sixty-seven chiefs of the Senecas, begging that no appropriation be made to carry out the treaty, as they did not intend to leave their homes in New York. In 1841 six or seven petitions were presented in Congress that the Indians in New York be forcibly removed. In a few days the committee was discharged from further consideration of the petitions.

In Massachusetts, Governor Everett, in his message in 1839, expressed the opinion that if the State had known all that it had since learned, it would not have consented to the request of the Ogden Company. A committee of the Senate reported in the same spirit, but expressed the opinion that it was too late to attempt to reverse the action which had taken place.

The testimony of W. H. Seward, at the time Governor of New York, corroborates the declarations of President Van Buren that the treaty was obtained by corruption. Gov. Seward, in a long private letter on the subject, dated Albany, June 15, 1841, writes:

"I am fully satisfied that the consent of the Senecas was obtained by fraud, corruption and violence, and it is therefore false, and ought be held void. The removal of the Indians, under a treaty thus made, would be a great crime against an unoffending and injured people; and I earnestly hope that before any further proceedings are taken to accomplish that object, the whole subject may be reconsidered by the United States."* He also said that the treaty of the United

* Quoted from "A Further Illustration of the Case of the Seneca Indians;" Phila., 1841, 9, p. 80.

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States with the Senecas was made in open violation of the settled policy of New York in dealing with them.

The final result of all the negotiations and disputes was, that very few of the Senecas or Tuscaroras removed beyond the Mississippi; and the Ogden Company, in view of the various difficulties which were raised in their path, consented to a compromise, by which the Senecas retained 52,000 acres of the 119,000 in controversy, being the two reservations which they now possess in Allegany and Cattaraugus counties. This act was what is called the treaty of 1842.

In consequence of these treaties of 1838 and 1842, there occurred a revolution in the Seneca tribe. They adopted something like a constitution and new laws, with a complete system of government. A very valuable report made to the Legislature, January 22, 1857, from the judiciary committee of the Senate, represents the rights of the Senecas to their lands as absolute, through a series of conveyances down to that date from the State of Massachusetts, from Phelps and from Morris; and that no parties had now any pre emptive rights in their lands. Thus out of the law of 1838 and the treaty of the same year had proceeded the law of 1845 of the State of New York, which guaranteed to the Senecas their lands. So that if that treaty was evil, a power for good has been seen to proceed from things evil in this case, as in multitudes of other cases in human affairs.

I have not been so rash as to form an opinion as to the expediency or justice of these transactions with so little opportunity of studying them. The facts are many, and the documents are voluminous. So far as New York alone is concerned, I had little occasion to be solicitous. Her relations to the Indians under her jurisdiction are abundantly justified by the Society of Friends, who constituted themselves the special agents to defend their rights in this very case. In the report of the joint committee of four yearly meetings in 1847, six years after the close of the dispute, they acknowledge explicitly the kindness of New York to the Indians within her jurisdiction. They say:

"The uniform justice and compassion of New York toward the Six Nations who were located on its territory present in retrospect one of the most pleasant scenes on the pages of our history."*

It may be felt by some that these Dearborn documents refer to dead issues, and that they have no relation to the live questions of the day, and are therefore worthless. Still, if the value put upon historical researches be not a delusion, if to secure the materials by means of

* Proceedings of Joint Committee, 1847.

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which to maintain the good repute and honor of a State, and thus guard against a blot upon her escutcheon, be a worthy aim, then I think that to be in possession of the complete papers of Massachusetts, acting under the authority of the United States and of New York, in a transaction where some have impugned the honor and justice of New York, is a valuable acquisition to the records of the State. If Massachusetts cared not for these papers, yet the day may come when New York may be glad to appeal to these documents, making Massachusetts to be a witness, to justify her treatment of the Indian denizens within her jurisdiction.

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PROPOSED ERECTION OF LOCAL HISTORICAL MONUMENTS.

Report of Special Committee on Archæology.

[Presented April 26, 1881.]

The city of Albany has a history, in its length of record, beyond that of most of the cities of the Union, and especially interesting in the features of that history. At the time of the settlement of the river at and near this place, England was under the authoritative, and in a degree, absolute government of the Stuarts. It was just subsequent to the time of Elizabeth, and the monarch was the son of Mary, Queen of Scots. Europe was old Europe then, with ways and words of rule and manner now faded out, or living in the more or less truth of coloring of books. From this interesting date of commencement, Albany, under differing names and governments and fealties of allegiance, has been a discovery, a trading post, a border fort, a frontier village, a city, and for the greater portion of its existence, on the verge of civilization, fenced in by the surroundings of savage life, when that life was in the conduct of an organized powerful Indian confederacy of tribes, skilled in their ideas of warfare. It has been a place greatly desired to be reached by conquest of savage and European war, and through all this, and out of all this, has attained what it is to-day — in the incidents and wealth and enterprise and life of a large city — the leading political capital of the north, except the place of the Federal government.

It is but an expected result of all these facts, that certain physical relics are yet here, and tradition of others is not yet obliterated. As to some of these, the only duty of the Institute is to give earnest and respectful recommendation. The conduct of preservation of them is, in its greatest features, for municipal and State authority.

Your committee understand distinctly, and their action is with this closely in view, as regulating the expression of their judgment to you, that the pecuniary question involved is the rock upon which effort at monumental memories wrecks. Large expenditures are initiated by enthusiasm, and reach a pitiable mediocrity and fail. We propose no individual effort except on the most economical basis.

There are to-day two buildings in Albany that, especially, should be preserved. The loss of them, or either of them, would be deplorable,

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because the one structure is, in its architecture, a reality before our eyes of a long gone-away history, and the other is history, and of the highest class. If any word the Institute can utter, or effort it can make, can avail toward their preservation, the future will be grateful ; for while any architecture can be produced — it is but the will of a nation to be expressed and St. Peter's can be placed on Broadway in faithful copy — all that is of that which can be effected by money — yet history cannot be bought. The work of time and association, only time and the ages can perform. One of these buildings is the Pemberton house, on the north-east corner of Columbia and North Pearl streets, of the date of Queen Anne's reign, while Marlborough was the invincible soldier, while Addison wrote for all time to imitate, while as yet the old race had not been supplanted by the House of Hanover, and the people of Albany knew no other sovereignty than the royal lady whom Dr. Johnson dimly remembered as in velvet; but interesting as that is, there is yet an association with its date, 1710, to us invaluable. Its construction must have been an object of interest to men who themselves had known those identified with the very first settlers of the trading post directly succeeding Hudson's discovery in the Half Moon. These old people would in the probabilities see with a kindly look another building, and over the work of the laborers thereon, while they talked about what Queen Anne and Marlborough were doing, recollect when the procedure in Holland was their home government. The architecture of the building is to-day in some features what it then was. The double door, with its smaller opening for observation, reminds us of what may now be seen in the town hall of Leyden, whose siege is of the vivid passages in Holland's history. It would be familiar to a citizen of the Low Countries. One only has to look down the street of Antwerp and he can to-day see what was ancient New York and Albany. Our bright architects can plan for us the semblance of old houses, but time charges a price which even Americans of the Pacific coast cannot pay.

Your committee have pleasure here in expressing to the Institute their grateful sense of Mr. Pemberton's intelligent appreciation of this property, and while he holds it they have no recommendation to make; but he, as all of us, will pass away, in the certainties of chronology. We would earnestly appeal, through the Institute, to the city to purchase that house and to keep it so long as the physical structure remains, as the history of what Albany was in the ancient life of its progress. Certainly they would not advise any extravagant municipal expenditure, but this is not a dangerous precedent. It can have but

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few followers, and the cost can be a definite ascertained sum, and as the building would be the property of all, all might easily bear the outlay. It is in the preservation of these things that a people show their intelligence, and strangers come to see them. If any man doubts this, let him consult the expense account of our people who go to Europe. They go to see the old — the crumbling, ruined, but not obliterated past. The grandeur of all things new, and of to-day, they can see at home.

While the Schuyler Mansion is in the occupancy of the Messrs. Tracey, your committee rest satisfied; but they would appeal to the State to possess itself of the house, where the young battle-torn, independence-seeking State of New York, as early as 1777, dared, after victory on the field of battle — a battle which won to us the belief in strength which turned to us the fervor of European power — the higher moral courage of a victory over the hate of war, and where was exercised the grandeur of a hospitality to the conquered, the praise of which was uttered in the British Parliament, when such words were tribute to our civilization. It showed of what American soldiers were made. It was our triumph in the dignity of a great nation. The State may well take this house to itself and care for it. It has waited more than the century to do so. It is proof how that mansion is remembered, that so late as 1879 it was visited by a lady, a relative of General Burgoyne, who had also visited the battle field of Saratoga. We do not name other incidents in its annals, as of giving its hospitalities to Washington, of being the scene of Alexander Hamilton's wedding, its attack by Indian raid, because in most of these features other places share the history. Nor need the expenditure be great. The price is fair subject of determination by fair authority, and the State would be the richer for such enlightened gift to history. Such acquisitions are really part of our "educational system." It is the facts of the past placed before the observation of the present without passing through the opinions or prejudices of any man.

And now your committee come to their immediate duty of presenting, through the Institute, to the consideration of the citizens of Albany its wishes respecting the memorials of localities. We, in each case, point only to a moderate expenditure. We intend the Institute shall recognize that whatever may be the warmth of our antiquarian zeal, we comprehend the cold safety of economy. We would rather that the surprise of our fellow-citizens should be at our self-restraint than at our recklessness.

First, we respectfully urge that at the north lines of the ancient stockade defense of the old city which is at, or near, the former resi-

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dence of that distinguished citizen and counselor, Abraham Van Vechten, in North Broadway near Van Tromp street, a white marble post shall be, with the consent of the owners of the real estate in that case, as in all others, placed on the sidewalk against the building, bearing this inscription:

THIS STONE

PERPETUATES THE SITE OF THE NORTH LINE OF THE ANCIENT STOCKADE DEFENSES OF THE CITY OF ALBANY AGAINST FOREIGN AND SAVAGE ENEMIES.

And a similar marble post at or near Division and South Broadway, to indicate the southern stockade line. Each of these memorials is estimated to have its cost defrayed by $40.

Albany had its ancient forts—the supposed strength, in degree, of its people and the north of the colony—the first, Fort Orange, of those who remained. (A fort — Nassau? — was perhaps earlier, on one of the islands.) The situation of Fort Orange was on the ground formerly occupied as a residence by the honored Simeon DeWitt, who for forty years held the place of Surveyor-General. The Susquehanna railway, former depot, in South Broadway, is about the same site. To get a just idea of the locality of the fortification and its usefulness, the river must be seen as it was before the construction of the pier and the outfilling, and the control of the river passage of batteaux and canoes and vessels perceived. The fort included in its protection the earliest church, and of this there is yet memorial in the name of the contiguous street. It was a fortification identified with Holland rule, and undoubtedly to the Indian of that day a memorable locality, as possessing the secret of the white man's strength, and its overthrow would, had it been attained by the French, have been welcome news at Paris.

It was from this fort that the measurement of a cannon ball's range may have been suggested by Governor Stuyvesant as the limitation of the Patroon's manorial claim over Albany—not then bearing that name; and our citizens who have not yet forgotten the south line of "the Colonie," may ask if the guns of Fort Orange carried so far.

On the site of this fort your committee recommend a marble post to be placed in proper position, with this inscription:

THE SITE OF FORT ORANGE

WHILE ALBANY WAS UNDER THE GOVERNMENT OF HOLLAND.

The cost of this would be defrayed, it is our estimate, by $40.

The old fort grew obsolete. It was by better engineering or force of changed circumstances seen that the command was on the height, and

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English military rule raised Fort Frederic—the name being, it is thought, given in honor of the House of Hanover. This stood in State street, south of and occupying in part the position of St. Peter's church. Nor is this inappropriate, for it is probable that the garrison contributed to the strength of the new ecclesiastical existence, which amidst a stranger people and a strange language, began a career, prosperous after varied experiences. At this date the site of the fort is remembered by a living man. This most interesting and authentic fact in its history was communicated to one of your committee by Mr. John Van Zandt, the intelligent old gentleman who will be remembered as the cashier of the Bank of Albany. When the battle of Saratoga was fought in 1777, the sound of the *cannon was heard by a soldier on this fort.*

Here, in place at the fence on the west side of St. Peter's church, your committee recommend the erection of a white marble pillar, bearing this inscription:

AT THIS PLACE IN THE STREET ROSE FORT FREDERIC, THE FORTRESS OF THE CROWN, WHILE NEW YORK WAS A COLONY OF ENGLAND.

The cost of the proper memorial is estimated at $30.

And now your committee turn with peculiar pleasure to a recommendation in which all hearts and all phases of opinion can unite for the courage and patriotism of man from history's brightest page. Albany possesses in its role of illustrious citizens one of the signers of the Declaration of Independence, Philip Livingston, whose residence was upon the lot now covered by Tweddle Hall, and, fortunately for memorial purposes, one of the chiefly important localities of the city, and by Mr. Tweddle's enterprise already so valuably designated.

To comprehend how justly memorial is here deserved, we must recollect that when that charter of our freedom was signed, we were not, as now, in the grandeur of a vast material strength. In 1776 our struggle was bearding the lion in his den—it was the resolve of the resolute. If the consent of the owners be obtained, your committee recommended that in or near the corner wall of the building a white marble tablet, at the cost of $150, be placed, bearing this inscription:

17—Albany—76
Remembers with pride that
This ground bore the Dwelling of
PHILIP LIVINGSTON.
Born 1716, Died 1778.
Who with Jefferson and Franklin
Signed the Declaration of Independence.

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Another grateful duty is before your committee. They recommend that when the new City Hall, now in process of construction, shall be sufficiently advanced to receive it, a tablet of white marble shall be built into the inner wall of the entrance, on which shall be cut the words addressed by George Washington to the citizens of Albany, in reply to their address welcoming him to Albany, 1783:

"While I contemplate with inexpressible pleasure the future tranquillity and glory of our common country, I cannot but take particular interest in the anticipation of the increase in prosperity and greatness of the ancient and respectable city of Albany, from whose citizens I have received such distinguished tokens of their approbation and affection. GEORGE WASHINGTON."

Your committee do not believe it is necessary to tell the Institute, or through it the people of Albany, that this prediction of the glory of our Union, and this anticipation of the greatness of Albany, so well phrased by the PATER PATRIÆ, deserves highest place amidst its imperishable archives. The intelligent gentlemen who form the City Hall Commission can easily effect the desired result.

These are not the only interesting features of past history left in our midst and in our vicinage. Few of those who, in its crowded thoroughfare, pass the old building at the south-east corner of South Pearl and State streets, notice the iron ANNO, which is relic of its date, whose figures were so unfortunately removed by its owner. Mr. Munsell, a name always to be spoken with honor by the Institute, had strong recollection of those figures as of the seventeenth century.

On the opposite bank of the river, a brief distance south of the Greenbush ferry, is the old dwelling, formerly owned by Jeremiah Van Rensselaer, and now the property of Mr. Callender. It is thought to be of the seventeenth century, but the proof is not distinct. It has in itself most interesting memorial, as yet showing the loop-hole stones, of ancient defense against the savages. These relics are most interesting as now placed, but whenever removed for any cause, they should be built into the wall of some modern building, for preservation.

Out of the desolation of taste which has characterized municipal action on this subject, there is yet preserved, in the city streets, some historic names which we would earnestly hope might be retained. Beaver street indicates the very cause of the vitality of the trading post, amidst all its discouragement of flood and foe; Van Tromp, the patriotic remembrance of the Hollander of the sea-sweeping broom of the brave sailor; to Church street allusion has been already made; Dean street remembers the name of the bold navigator who took an

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Albany sloop to China, puzzling the Orientals to arrive at her nautical measurement, which difficulty they, however, overcame by placing a stick at the stern to represent a mainmast. Over the fate of the nomenclature obliterated, there can be only grief. It is not the province of this report to express the proper degree of contempt on the servile imitations of the metropolis that have taken their place.

Your committee mention with profound respect and admiration the care taken by the venerable (North) Dutch Church of its precious ancient communion plate, two of whose beakers go back to a time so remote as that near the occurrence of the great fire of London, one, in its date, preceding that event by two years.

They have seen with much satisfaction and due honor the efforts so successfully made in other portions of the State to perpetuate history. The city of Elmira is honored by its interesting monument, in good taste, and not burdensome cost, of the decisive battle which, in the Sullivan campaign of 1779, ended the Iroquois power. The former occupation of their village by the Senecas has, by the intelligent action of the people of Waterloo, been commemorated by a stone pillar. These things interpret refinement and educate the people. How many of the localities of the State have to this day neglected their historical duty! But, while we thus reproach them for being faithless to their archæology, let us penitently admit that our censure will be more appropriate when Albany itself has done its duty.

Our respected neighbor, the city of Schenectady, has a university whose success is gratifying to us — has an historical scholar in whose honor we speak, but it is sadly faithless to its most interesting history. It has no monument of the great raid of 1690, whose narrative was the theme of interest across the great sea — it has no memorial of Corlaer, who, going out of Albany to find the still more remote frontier settlement, by his sagacity and estimable qualities so won the heart of the savages that thereafter they gave his name as the equivalent of Governor, and he died while en route to Montreal, where his excellence had won him an invitation from the French ruler.

Hudson is, by its name, a remembrance of the navigator who disclosed the noble river, and is content with such easy remembrance.

Utica has an historical society, and, creditably to itself, publishes its transactions, but where is its memorial of the site of Fort Schuyler?

Rome is a city, but has it made enduring monumental record of Fort Stanwix, the place of war and treaty?

In Little Falls there is yet a most interesting relic of a portion of

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the structure of the pre-Erie canal, the effort of early New York to avail itself of that depression of the hills, which constitutes the great gateway to the West. The structure is in decay; while a little effort and taste would make it pleasantly available to the admiration and instruction of the millions who travel by its side. The stones are ready to fall from its graceful, single arch bridge — the lock is incumbered with encroachments, and history is covered up.

Your committee have been careful to avoid the encouragement to any large expenditure. It is not intended, nor desirable, that any one person should give all that the report recommends. It may be that, in the prosperity which has attended enterprise and industry among us, the small cost suggested, in each case in this report, may attract the kindly notice of some citizen who may identify his name with the good work; and to some, one locality will be more familiar than to another. They would hope it may be the good fortune of the Institute to see this work done. They believe it a result of intelligence, of cultivation, of the attrition of a refined people. It is for this day to do, for as yet the memories of living men connect us with history. It is for us to show that, with our increase in material prosperity, came our advance in intelligence.

If they shall succeed in directing the notice of the citizens of Albany to this subject, as not in the line of mere sentiment, but as in the truth of education of gentlemen, the Institute will have a felicitous recollection of good achieved. In all London, one of its most precious possessions, and every year enhancing in value, is the plain stone inclosed in the wall of a church, which has to be sought out, but which the intelligent man does seek out, because it is Roman history in modern England.

If we succeed in our archæology, we give value to our city, as having had the taste and sense to preserve the physical association of a rich and prosperous community in its high civilization, with the brave trader founders who dared the wild beast and the wild man, to assert the supremacy of thought.

W. H. BOGART,
DAVID MURRAY,
S. C. HUTCHINS,
LEONARD KIP,
ABRAHAM LANSING,
Committee.

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BRYOZOANS OF THE UPPER HELDERBERG AND HAMILTON GROUPS.

By James Hall, LL.D.

[Read, by title, before the Albany Institute, March 29, 1881.]

The present paper is chiefly devoted to the Bryozoans of the Upper Helderberg and Hamilton Groups.* The descriptions in full were communicated in the Thirty-third Report upon the State Museum of Natural History, in January, 1880, but that document has not yet been printed. The present paper is an abstract of the original, with the descriptions abbreviated to conform to the space at my disposal.

The number of species has been greatly increased by a series of specimens from the Falls of the Ohio river, very kindly communicated to me by Victor W. Lyon, Esq., of Jeffersonville, Indiana; and many of the forms cited from that locality are due to him. In this collection we have not only the expanded celluliferous parts, but the bases or radical portions of the fronds, in a great number of examples; and these serve not only to aid in the determination, but to confirm the specific distinctions adopted.

Although unwilling to increase the number of specific designations, the examination of numerous specimens of nearly all the species has left no alternative but to follow the course here adopted.

We have within a few years discovered the existence of a silico-calcareous band at the base of the corniferous limestone in western New York and Canada West. This horizon corresponds with that of the Schoharie grit in eastern New York, but the material appears to have been in solution before deposition; the sea-bed, in this condition, affording a most favorable soil for the growth of Bryozoans; — the rock now being largely composed of the broken and comminuted fragments, and of larger and more complete portions of these organisms. In the weathered portions of this rock, the original substance of the Bryozoan has been dissolved, leaving a sharp, clean impression preserving the most delicate and minute characters of the fossil.

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*I have here included a few forms of Chætetes, which, from their structure, can scarcely be separated from the Favositidæ, while the difference between this genus and Trematopora is hardly determinable by any well marked characters.

Under the Fenestellidæ I have not adopted the genus Polypora, though describing species with from two to four ranges of cells on the branches. The numerous examples of this variation have rendered the distinction between the genera obsolete; but the question will be more fully discussed in the Report on the State Museum of Natural History.

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Many of the species known in New York likewise occur in Canada; and further collections will doubtless show that nearly all are common to the two regions.

In the more calcareous portions of the formation, the determination of specific characters is attended with great difficulty, and many still remain for future study and decision.

The Hamilton Group, in nearly its entire extent, has furnished numerous Bryozoans of varied and interesting forms; which will be given in full in the State Museum Reports; the space allotted to this communication admitting only such as have been studied and arranged to precede the FENESTELLIDÆ. The descriptions of the latter are however completed, and in the hands of the printer.

In the determination of all these forms, as well as in their illustration in numerous excellent figures, I have been greatly indebted to Mr. George B. Simpson, except for whose zeal in the study and careful discrimination of the specific forms, I should, amidst other duties, have left, for the present at least, many of them undetermined and undescribed.

CHÆTETES, *Fischer.*

CHÆTETES CREBRIRAMA, *n. sp.*

Coral ramose, solid; branches frequent, bifurcating, occasionally trifurcating; cells tubular, polygonal, gradually diverging till within .75 mm. of the surface, when they turn more abruptly, opening slightly obliquo, diameter at aperture .25 mm., in the interior walls thin, at the surface thickened, the thickness of the walls frequently equal to the diameter of an aperture; tubes septate; septa very thin and fragile, occurring at irregular intervals; on the surface are maculæ distant from each other from 2.5 mm. to 3 mm., which are sometimes elevated. The maculæ form a prominent feature of the branches.

Locality — Falls of the Ohio river, near Louisville, Ky.

CHÆTETES ÆQUIDISTANS, *n. sp.*

Ramose, solid; branches infrequent, diameter 5 mm.; cells tubular, polygonal, septate; septa strong, near the surface there are four in the space of one mm., in the remaining portion from eleven to thirteen, equidistant; cell-tubes 8 mm. in length, apertures oval, length 5 mm., with spinules at the angles, surface with maculæ of large cell-apertures.

Locality — New York.

CHÆTETES EGENUS, *n. sp.*

Ramose; branches infrequent, diameter 5 mm.; cells tubular polygonal, non-septate, walls very thin; apertures very irregular in size

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and form, frequently hexagonal, length from equal to three times the width, which is usually about .35 mm.; at the angles are frequently strong obtuse spines.

Locality — Onondaga Vallev, N. Y.

CHÆTETES ? (TREMATAPORA ?) INTERNASCENS, *n. sp.*

Ramose, solid; diameter 8 mm.; cells tubular, polygonal, arising from the center of the branch, gradually diverging till within one mm. of the surface, when they turn more abruptly outward, frequently ten mm. in length, nearly the entire length angular; apertures circular or oval, diameter .33 mm., contiguous, oblique, subimbricating; on one side of the aperture the cell-wall projects above the surface .17 mm.; maculæ at irregular distances, centers noncelluliferous; tubes septate; exterior of cell-wall transversely corrugated.

Locality — Falls of the Ohio river.

TREMATAPORA, *Hall.*

TREMATOPORA ARBOREA, *n. sp.*

Ramose, solid; branches frequent, diameter 2.50 mm.; cells tubular, polygonal; apertures oval; cells septate; septa occurring at irregular intervals; length of apertures .22 mm., width two-thirds the length, usually irregularly arranged, but sometimes occurring in transverse oblique rows, distance variable; the margins of apertures and intervening space have numerous minute spines, from six to eight, surrounding an aperture; no maculæ.

Locality — Falls of the Ohio river.

TREMATOPORA ? ANNULATA, *n. sp.*

Ramose, solid; branches occurring at intervals of from 4 to 15 mm., diverging at an angle of 45°; diameter three mm.; cells tubular, regularly curving to the surface, diameter at aperture .25 mm., polygonal, walls thin, sometimes thickening at the surface constricting the cell-apertures; cells septate; septa closely arranged; sometimes angular pits occupy the intercellular space of the surface, apertures irregularly arranged, with small spines at the angles, giving to the surface an aculeate appearance; at intervals of two mm. occur elongated elevations at right angles to the branch, two or more elevations being on a line and giving to the branch an annulated appearance; a narrow space along the middle of the elevations without apertures, but frequently with small pits. This species can be easily distinguished by its strong annulations.

Locality — Falls of the Ohio river.

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TREMATOPORA ANNULATA, VAR. PRONASPINA, *n. var.*

Ramose; branches infrequent, diameter two mm.; cells tubular, polygonal, gradually diverging, diameter of aperture .25 mm.; cell-walls of the interior thin, thickened at the surface; cells septate; septa occurring at irregular intervals; width of aperture greater than the length, subimbricating; at the base of each aperture a strong oblique spine, which feature distinguishes it from the ordinary forms of *T. annulata.*

Locality — Falls of the Ohio river.

TREMATOPORA ALTERNATA, *n. sp.*

Ramose, solid; branches infrequent, diameter slightly more than one mm.; cells tubular, cylindrical, opening directly outward; apertures oval, length .38 mm. width two-thirds the length, margins thin, scarcely elevated, arranged in longitudinal parallel rows; fifteen in the space of five mm., five or six rows on a branch, apertures alternating, forming oblique, transverse longitudinal rows, separated by strong granulose ridges; at the base of each aperture is a strong conical node. The most prominent feature of the surface is the longitudinal ridges alternating with the rows of nodes.

Locality — Onondaga Valley, N. Y.

TREMATOPORA RECTILINEA, *n. sp.*

Ramose, solid; diameter 1.20 mm.; cells tubular, cylindrical, apertures oval, arranged in parallel longitudinal rows, fourteen rows on a branch, alternating — forming equally prominent oblique rows; space between apertures equal to width of aperture; space between longitudinal rows elevated or striated, granulose; at the base of each aperture there is a strong conical node.

Locality — Onondaga Valley, N. Y.

TREMATOPORA SCUTULATA, *n. sp.*

Ramose, solid; branches occurring at intervals of from 5 to 12 mm., diameter one mm.; cells tubular, apertures rhombiform, length .33, width .25 mm., closely arranged in oblique parallel rows at an angle of 45° to the axis of the branch, separated only by the cell-walls; the margins are minutely granulose, and at each angle is a strong node.

Locality — New York.

CALLOPORA, *Hall.*

CALLOPORA IRREGULARIS, *n. sp.*

Ramose, hollow; diameter of branch three mm., thickness of the bryozoum .55 mm.; inner surface a wrinkled epitheca; cells tubular,

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opening directly outward; apertures circular, diameter from .25 to .33 mm., irregularly disposed; the surface has maculæ destitute of apertures, from 1 to 1.5 mm. in diameter; apertures nearest the maculæ slightly larger than the others, margins strongly and equally elevated, intermediate space sometimes with shallow angular pits.

Locality — New York.

CALLOPORA ACULEOLATA, *n. sp.*

Ramose; diameter of branches two mm.; cells opening directly outward; apertures circular or nearly circular, length .45 mm., distance between varying from contiguity to .25 mm.; margins strong and distinctly elevated, and having from one to three comparatively strong nodes; intermediate space occupied by minute angular pits, usually one or two series between two adjacent apertures.

CALLOPORA MULTISERIATA, *n. sp.*

Ramose, solid; branches diverging at an angle of 80°, diameter two mm.; cells tubular, cylindrical; apertures oval, length .33 mm., irregularly disposed; margins thin, not elevated, intermediate space with minute angular pits arranged in longitudinal rows giving a striated appearance to the surface; from 5 to 10 series between adjacent apertures.

Locality —Warner's Quarry, south of Leroy, Genesee county, N. Y.

LICHENALIA, *Hall.*

LICHENALIA SUBSTELLATA, *n. sp.*

Lamellose expansions, free or encrusting, or forming masses by superimposition; each layer usually one mm. in thickness; cells tubular, varying in length from .25 to 4 mm.; apertures usually circular, diameter .28 mm., closely and irregularly arranged; surface with maculæ, usually elevated, the centers with out apertures; cells radiating from maculæ larger and more oblique than the others; apertures variable, sometimes opening directly outward, margins equally elevated, but usually oblique; margins unequally elevated, occasionally very oblique and imbricating, the most strongly elevated portion produced and spiniform, sometimes bidenticulated; cell-tubes septate, eight septa in space of one mm.; frequently contorted.

Locality — Falls of the Ohio river.

LICHENALIA DENTICULATA, *n. sp.*

Lamellose expansions, or massive by superimposition of layers; cells tubular, diameter .23 mm., one-half of the margin is very

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strongly elevated, frequently projecting over the aperture, with two strong denticulations; apertures crowded; surface with numerous elevated maculæ; cells contiguous to centers of some maculæ larger than others, bases of maculæ contiguous; interior intercellular space with tubuli; diameter of tubuli .12 mm. divided by numerous septa.

Locality — Falls of the Ohio river.

LICHENALIA BISTRIATA, *n. sp.*

Celluliferous on one or both sides, sometimes massive by superimposition of layers; diameter of cells .36 mm.; apertures closely arranged, margins not distinctly elevated; interior intercellular spaces vesiculose; vesicles irregularly arranged. On the interior of the cell-tubes, situated close together, are two strong striations, which appear on the surface as denticulations, projecting from one-half to two-thirds across the aperture; this feature distinguishes it from all other species.

Locality — Falls of the Ohio river.

LICHENALIA CRUSTACEA, *n. sp.*

Lamellate expansions, or massive; layers sometimes not more than .25 mm. in thickness; apertures circular, diameter .33 mm., irregularly arranged, sometimes so closely arranged as to be distorted; margins irregularly elevated, not denticulated; surface frequently broken; at the margin the cells are very oblique; surface with elevated maculæ; interior vesiculose.

Locality — Falls of the Ohio river.

LICHENALIA SUBCAVA, *n. sp.*

This species is distinguished from all others of this genus as follows: The elevated maculæ of the surface are entirely destitute of all apertures, and the space beneath them is hollow; intercellular space of interior of bryozoum vesiculose; apertures subtriangular, width .20 mm.

Locality — Falls of the Ohio river.

LICHENALIA ALTERNATA, *n. sp.*

Lamellate expansions; greatest thickness observed .75 mm.; cells closely arranged, very oblique, alternating and imbricating; apertures broadly oval, length .35 mm., slightly elevated maculæ, distant 5 mm., with cells slightly larger than the others, not radiating; space

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between apertures smooth and slightly concave, intercellular space of the interior vesiculose.

Locality—Falls of the Ohio river.

LICHENALIA CONULATA, *n. sp.*

Ramose, hollow, or lamellate expansions; thickness varying from .50 to 5 mm., sometimes branches solid; cells tubular; apertures circular, diameter .20 mm., margins unequally elevated, inclining toward the center of and constricting the aperture, giving the appearance of tumid lips; margins of adjacent cells in contact; surface with numerous rounded elevations, the centers of which are distant .50 mm.; height 1.50 mm.; cells of maculæ larger than others and radiating; cell-tubes septate; septa 5 in space of one mm.; intercellular space of interior vesiculose. This species is easily distinguished by its prominent conical elevations.

Locality—Falls of the Ohio river.

LICHENALIA CLIVULATA, *n. sp.*

Lamellate or cylindrical expansions; diameter of cell-apertures .17 mm.; margins unequally elevated, the stronger portion projecting over the aperture, and having two minute denticulations; around each aperture a narrow obscurely polygonal depression; surface with numerous elevated maculæ, centers distant from two to three mm., bases often in contact with each other; surface being composed of rounded elevations, and finely granulose.

Locality—Falls of the Ohio river.

LICHENALIA CARINATA, *n. sp.*

Intercellular space vesiculose; vesicles large, irregularly disposed, apertures circular, oblique to the surface, diameter .28 mm., irregularly arranged, margins unequally elevated, one side projecting over and constricting the aperture; the upper portion of the cell-wall is sometimes exposed for nearly two-thirds the entire length; along the middle of the wall is a sharp slightly elevated carina, sometimes projecting beyond the margin as a denticulation; on the surface are maculæ, the centers of which are depressed and without apertures; cells in contiguity to the maculæ larger than the others, and the radiating space between apertures with minute pits.

Locality—Falls of the Ohio river.

LICHENALIA PERMARGINATA, *n. sp.*

The specimens observed are celluliforus on both sides; cell-apertures .40 mm. in diameter, irregularly arranged, margins strong; on

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the surface are broad elevations the centers of which are essentially flat and without apertures, distance from centres 17 mm., width at base 5 mm., surface finely granulose; sometimes obscure ridges from one aperture to another.

Locality—Onondaga Valley, N. Y.

LICHENALIA LUNATA, *n. sp.*

Lamellate, or massive; cells tubular, diameter at aperture .38 mm., margin of one-half slightly elevated or entirely wanting the other half strongly elevated, projecting over the aperture, the central portion more extended, giving to the aperture a cunate form, which distinguishes it from other species; apertures irregularly arranged; surface with gently elevated maculæ the centers of which are distant from each other about 5 mm.

Locality—Falls of the Ohio river.

LICHENALIA ALVEATA, *n. sp.*

Lamellate expansions; cells tubular, oblique or at right angles to the surface; usually alternating and imbricating; apertures closely arranged; diameter .45 mm., margins unequally elevated, the stronger portion, comprising one-half, strongly elevated, projecting, with two slight denticulations, sometimes the upper portion of the cell-wall is exposed nearly its entire length; surface with numerous elongate concave maculæ, without cell-apertures, four mm. in length and one in width, forming narrow channels, interior intercellular space vesiculose.

Locality—Falls of the Ohio river.

LICHENALIA RADIATA, *n. sp.*

Lamellate; cell-apertures usually oblique, subtriangular, irregularly disposed, diameter .50 mm., margins unequally elevated, one portion strongly elevated, projecting over and giving to the aperture an arched or triangular form; maculæ broad, circular, distant from six to eight mm., slightly elevated centers without cell-apertures, granulose; cells radiate very distinctly from the centers; interior intercellular space vesiculose.

Locality—Onondaga Valley, N. Y.

LICHENALIA PALIFORMIS, *n. sp.*

Ramose, hollow; diameter 3 mm., thickness of bryozoum .50 mm., apertures with a diameter of .20 mm., usually closely and irregularly disposed, but sometimes in oblique transverse lines; at the base of each aperture are two slight denticulations extending to and par-

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tially closing the apertures, giving them an acutely semielliptical form of one mm. in length; margins of apertures not elevated, space between apertures angular, striated; at base of each aperture slight node; surface sometimes presenting a distinctly reticulated appearance.

Locality—Falls of the Ohio river.

LICHENALIA LONGISPINA, *n. sp.*

Lamellate, cell-apertures oval, length .35 mm. irregularly disposed; between adjacent apertures, thin, sharp elevations, uniting and forming polygonal areas, which sometimes have a height of one mm., at the angles of the elevations are strong spines, one mm. in length.

Locality—Falls of the Ohio river.

LICHENALIA CIRCINCTA, *n. sp.*

Foliaceous; cells oblique, diameter of apertures .20 to .25 mm., margins unequally elevated, one portion strongly elevated, extending over and constricting the aperature, bidenticulated, between apertures are thin, oblique elevations, uniting, forming polygonal elevations around the apertures; maculæ distant four mm., centers without apertures; cells radiating, larger than the others; the more oblique the cells, the less conspicuous the elevations.

Locality—Falls of the Ohio river.

LICHENALIA COMPLEXA, *n. sp.*

The manner of growth of this species is the same as that of *L. circincta*, but the apertures are larger and at a greater distance apart, the enclosing walls are stronger, the frond presenting a much stronger appearance, the polygonal elevations have very much the appearance of the cell mouths of a Favosite, and without a close examination might be mistaken for them.

Locality—Onondaga Valley, N. Y.

LICHENALIA GRANIFERA, *n. sp.*

Foliaceous; cell-apertures usually oblique to surface, oval or subtriangular, length .33 mm., margins sometimes equal, at other times the upper portion of cell-wall exposed more than the length of aperture, irregularly disposed; maculæ not elevated, centers distant four mm., without apertures, cells radiating from centers, intercellular space with prominent granules, cell walls very fragile, margins usually bidenticulate; interior intercellular space vesiculose.

Locality—Falls of the Ohio river.

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LICHENALIA PYRIFORMIS, *n. sp.*

Lamellate; cells tubular, on a large portion of the frond very oblique in their entire length, on the remaining portion oblique a part of their length, then turning abruptly outward; diameter of aperture .35 mm., when oblique the upper portion of the wall is exposed from .50 to .73 mm., the edges denticulated; looking perpendicularly on the frond, the margins and cell walls are pear shaped, as seen obliquely across the frond, the cell walls and projections resemble strong spines; maculæ distant about six mm., elevated cells of the centers confused; intercellular surface crowded with small spines; intercellular space of the interior occupied by large and irregularly disposed vesicles; the denticulations are formed by the projection of two striæ, situated near together and continuing the entire length of the interior of the cell tube.

Locality—Falls of the Ohio river.

GENUS LICHENALIA.

SUBGENUS PHRACTOPORA, *n. s. gen.*

The manner of growth is essentially the same as that of Lichenalia, the surface is raised at irregular intervals into elevated crests, which are celluliferous on both sides; cells arising from a mesial epitheca, the crests unite leaving irregular cavities between them.

PHRACTOPORA CRISTATA, *n. sp.*

Lamellate; crests sometimes attaining a height of seven mm., base from one to two mm. thick, gradually growing thinner, summit sharp, noncelluliferous; at the middle of each crest is a triangular noncelluliferous space two mm. wide and three long; the portion of the frond from which the crests arise celluliferous on one side only; cells cylindrical, closely disposed, alternating and imbricating, diameter of aperture .25 mm., margins unequally elevated, one portion projecting over and constricting the aperture; maculæ numerous, slightly elevated; interior intercellular space vesiculose.

Locality—Falls of the Ohio river.

THALLOSTIGMA, *nov. gen.*

Bryozoum consisting of broad foliate expansions similar to LICHENALIA, but with the intercellular space punctate upon the surface.

THALLOSTIGMA INTERCELLATA, *n. sp.*

Lamellate; cell-apertures circular or slightly oval, diameter .25 mm., irregularly and closely disposed, margins elevated, having from one to

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four spines; between adjacent apertures usually one series of pits, occasionally two or three, interapertural pits varying from square to triangular; interior intercellular space vesiculose.

Locality—Falls of the Ohio river.

THALLOSTIGMA SPARSIPORA, *n. sp.*

Lamellate; celluliferous on both sides; apertures usually elongate-oval, length .38 mm., sometimes circular with diameter of .20 mm., margins distinctly elevated and granulose, usually irregularly disposed, distant from each other from .25 to .66 mm.; on one frond they are regularly arranged in alternating rows; from the small size of aperture and distance apart they present a scattered appearance; occasional maculæ; interapertural pits minute, granulose; granules sometimes obscuring other features.

Locality– Onondaga Valley, N. Y.

THALLOSTIGMA LAMELLATA, *n. sp.*

Cell-apertures opening outward, circular, diameter .45 mm., irregularly disposed; greatest distance apart slightly less than the diameter of an aperture; margins distinctly elevated, granulose. There are occasional maculæ destitute of cell-apertures, about seven interapertural pits in one mm., from one to three series between adjacent apertures, granulose.

Locality—Onondaga Valley, N. Y.

STICTOPORA, *Hall.*

STICTOPORA GILBERTI.

Ptilodictya (*Stictopora*) *Gilberti* Meek. Proc. Acad. Nat. Sci. Phila. 1871.

Branching dichotomously; a greater portion of the branches nearly flat, abruptly narrowing to the edge bifurcations frequent, width of noncelluliferous margin .78 mm.; from frequency of bifurcations the margins of branches are more or less curved; cells tubular, for one-half the length parallel to the mesial plate, then abruptly turning and opening at right angles to the surface; mesial-plate transversely corrugated and striated longitudinally; corrugations arched; cell-apertures oval, arranged in longitudinal rows, increasing in number as the branch widens, separated by a ridge; margins elevated, on one side a denticulated projection, frequently concealing one-half of the aperture; interior of the branch finely vesiculose.

Locality—Falls of the Ohio river and New York.

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STICTOPORA OVATIPORA, *n. sp.*

Bifurcations occurring at intervals of from five to seven mm.; width of branches, three mm.; margins parallel, slightly obtuse, non-celluliferous margins, .45 mm. in width; cell-apertures oval, length, .33 mm., arranged in longitudinal rows, margins distinctly and equally elevated, ranges separated by a broad, rounded ridge, higher than the margins of apertures, giving to the apertures the appearance of being situated in a channel; interior of stipe vesiculose.

Locality—Falls of the Ohio river.

STICTOPORA SEMISTRIATA, *n. sp.*

Bifurcations occurring at intervals of from eight to eleven mm., diverging at an angle of from sixty to ninety degrees, width from three to four mm., greatest thickness, .38 mm.; margins thin, sharp, non-celluliferous margin, .50 mm. in width; apertures circular, diameter .22 mm.; on a portion of the frond irregularly arranged, on other portions in longitudinal rows, separated by a ridge. The margins of the branches are more nearly parallel than those of *P. gilberti;* and the stipe thinner.

Locality—Near Leroy, Genesee county, N. Y.

STICTOPORA FRUTICOSA, *n. sp.*

Bifurcations occurring at intervals of from three to ten mm.; branches diverging at an angle of 45 degrees, width 2.50 mm.; non-celluliferous margin, .35 mm. in width; cell-apertures .50 mm. in length, arranged in longitudinal parallel rows, from six to eight rows on a branch, margins slightly elevated, granulose, space between rows elevated, with obscure granulose striations. The appearance of the species varies greatly, accroding to the degree of weathering.

Locality—New York.

STICTOPORA RIGIDA, *n. sp.*

Bifurcations occurring at intervals of from four to fifteen mm.; width of branches from two to three mm.; margins parallel; greatest thickness .50 mm.; width of non-celluliferous marginal space, .25 mm.; cell-apertures oval, length .25 mm., twelve apertures in the space of five mm., distinctly arranged in longitudinal rows, separated by a strong, angular, finely striated ridge; transverse space between the apertures flat, obscurely striated; margins thin, equally elevated.

Locality—Near Leroy, Genesee county, N. Y.

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STICTOPORA INVERTIS, *n. sp.*

Bifurcations occurring at intervals of from eight to ten mm.; width of branches, 2.5 mm., greatest thickness, 1.50 mm., width of non-celluliferous marginal space, .35 mm.; cells tubular, one mm. in length, for one-half this length nearly parallel with the mesial-plate, then turning abruptly, and opening directly outward; apertures circular, very frequently arranged in a V-shaped order across the branch; on the narrower portions of the branch they form oblique, arching, transverse rows; margins of apertures strongly and equally elevated.

Locality—New York.

STICTOPORA RHOMBOIDEA, *n. sp.*

Bifurcations frequent; branches widley diverging, width two mm., greatest thickness one mm., edges obtuse; cell apertures oval, length .35 mm., disposed in irregular longitudinal rows, usually alternating, margin thin, slightly elevated, granulose; between the apertures is a thin sinuous granulose ridge, frequently touching the margins of the cells; in the transverse space between cells the ridges approach each other frequently touching and coalescing.

Locality—Near Leroy, Genesee county, N. Y.

STICTOPORA LINEARIS, *n. sp.*

No bifurcations occur on fragments observed, though probably they will be found in larger fragments; width of branch 1.50 mm., greatest thickness. 50 mm.; cell-apertures circular, diameter .20 mm., arranged in longitudinal parallel rows, five or six rows on a stipe, 14 apertures in the space of five mm., margins thin, slightly elevated, longitudinal rows separated by comparatively strong angular ridges; non-celluliferous margin very narrow or entirely wanting.

Localities—Onondaga Valley and Leroy, N. Y.

STICTOPORA PERARCTA, *n. sp.*

Branches infrequent, diverging at an angle of 45°, width .90 mm., greatest thickness .50 mm., non-celluliferous marginal space very narrow and frequently entirely wanting; cell apertures, circular or broadly oval, diameter .20 mm., arranged in longitudinal parallel rows, separated by a comparatively strong rounded granulose ridge, margins of apertures thin, slightly elevated, granulose.

Locality—Onondaga valley, N. Y.

INTRAPORA, *nov. gen.*

Bryozoum growing as in STICTOPORA; stipe and branches broad, bifurcating at somewhat regular intervals. Both sides celluliferous,

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the intercellular spaces regularly punctured or pitted as if by numerous minute cell-apertures — entire intercellular space vesiculose.

INTRAPORA PUTEOLATA, *n. sp.*

Bifurcations occurring at intervals of from six to eight mm., branches variable in width, on most of the specimens observed from two to four mm., but on some 20 mm; forming lamellose expansions; greatest thickness one mm., width of non-celluliferous margin .5 mm., base of frond thin, spreading; attached to foreign substances, cells for about one-half their length parallel to the mesial-plate, then abruptly turning and opening directly outward; apertures oval, length .23 mm., occasionally circular, sometimes irregularly disposed, at other times quite regularly arranged in oblique transverse rows at an angle of 45° to the margin of the branch, closely arranged, margins strong and equally elevated; intercellular space occupied by minute angular pits, variable in shape and size, usually a single series between two adjacent apertures, sometimes two and very rarely three; these pits cover the non-celluliferous margin of the branch.

Locality—Falls of the Ohio river.

THAMNOPORA, *nov. gen.*

Bryozoum a narrow branching stipe; the principal stipe and branches celluliferous on both sides. The divisions are not by bifurcation as in STICTOPORA, but by lateral and abrupt divergence from the main stipe.

THAMNOPORA DIVARICATA, *n. sp.*

Width of stipe 1 to 1.25 mm., thickness at the middle .45 mm., width of lateral branches .50 mm., diverging from the stipe at an angle of 90°; cell-apertures oval; length .30 mm., arranged in two longitudinal parallel rows; sometimes three rows on the main stipe for a short distance occur; width of non-celluliferous marginal space of the main stipe about .25 mm., on the lateral branches very narrow or entirely wanting; longitudinal ranges separated by a ridge, which is frequently elevated above the margin of apertures, angular, giving to the branch a subangular appearance; margins of apertures distinctly and equally elevated; margins of branches usually entire, but sometimes serrated.

Locality—Near Buffalo, N. Y.

PRISMOPORA, *nov. gen.*

Consisting of triangular branches, frequently forming irregular groups; sides equal or unequal, subangularly concave, celluliferous on

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each face; cells arising from internal plates, which radiate from the center and extend to each angle; apertures regularly or irregularly arranged.

PRISMOPORA TRIQUETRA, *n. sp.*

Consisting of an irregular group of branches, diverging at an angle of from forty-five to ninety degrees; sides subangular at the middle; angles at margins sharp, width of each face, 3.50 mm.; frequently a branch trifurcates; a non-celluliferous space, at the margins of each side, of about .65 mm. in width; cell-apertures circular or oval, sometimes subtriangular; diameter .25 mm.; variable, sometimes opening directly outward, at other times so oblique that the upper portion of the cell wall is exposed for nearly two-thirds its entire length; those nearest non-celluliferous margin larger than the others (all intermediate forms occurring); at the middle of the branch are from one to three longitudinal ranges of apertures; the remaining apertures more or less distinctly radiate from the center of the branch; rows of apertures frequently separated by a ridge.

Locality—Falls of the Ohio river.

PRISMOPORA PAUCIRAMA, *n. sp.*

Branches comparatively infrequent; two of the sides are equal in width, the remaining one wider; the equal sides are 2.75 mm. wide, the third four mm.; branches occurring at intervals of twenty mm. or more; non-celluliferous space at the margin, .66 mm. wide; apertures circular, diameter .25 mm., arranged in longitudinal rows, and more distinctly in transversely oblique rows; the apertures are smallest at the middle of the branch, gradually growing larger to the marginal space; intercellular tissue vesiculose.

Locality—Thompson's Lake, Albany county, N. Y.

SCALARIPORA, *nov. gen.*

Bryozoum consisting of irregular groups of triangular branches, more or less concave, traversed transversely by sharp, elevated laminæ, situated at regular distances apart; branches celluliferous on each face; cells arising from internal plates, radiating from the center to each angle of branch; margins and summit of laminæ non-celluliferous.

SCALARIPORA SCALARIFORMIS, *n. sp.*

Branches frequent, sides very concave, angles acute, width of each side to four mm.: summits of transverse laminæ essentially straight, height at the middle of the branch, one mm., thickness at base, .25 mm., distant 1.50 mm., width of non-celluliferous marginal space .48

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mm.; of summit of laminæ .10; cell-apertures of branch minute oblique or opening directly outward, margins equally elevated, constricting the aperture; cells of laminæ very oblique, irregularly disposed.

Locality—Falls of the Ohio river.

SCALARIPORA SUBCONCAVA, *n. sp.*

Branches infrequent; two of the sides have each a width of 2 mm., the third 1.50 mm.; transverse laminæ, .48 mm. high; distant, 1.33 mm.; non-celluliferous marginal space very narrow; cell-apertures, .15 mm. in diameter, irregular in their disposal and mode of opening, those on transverse laminæ very oblique.

Locality—Falls of the Ohio river.

GLAUCONOME, *Goldf.*

GLAUCONOME NODATA, *n. sp.*

Primary branches, .65 mm. in width; transverse section broadly ovate; non-celluliferous side gently rounded and finely striated; space between lateral branches equal to the width of a branch; six branches in the space of five mm.; cell-apertures circular, opening almost directly outward, laterally arranged in two rows, one on each side of the branch; space between ranges of apertures strongly elevated and with prominent nodes; cells of secondary branches slightly smaller and more closely arranged than those of the primary.

Locality—Near Buffalo, N. Y.

GLAUCONOME SINUOSA, *n. sp.*

Transverse section of a branch broadly subcuneiform, width of primary branches .90 mm., of secondary branches .50 mm., space between secondary branches equal to the width of a branch; non-celluliferous side unknown; cell-apertures circular, in two ranges, usually opening laterally at an angle of forty-five degrees, margins of apertures very prominent; branches carinated, carina thin and very sinuous.

Locality—Near Buffalo, N. Y.

GLAUCONOME TENUISTRIATA, *n. sp.*

Non-celluliferous side of branches gently rounded, finely striated; width of primary branches 60 mm., of secondary .33 mm., space between lateral branches .66 mm.; three cell-apertures in the space of five mm.

Locality. Near Buffalo, N. Y.

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THAMNISCUS, *King.*

THAMNISCUS NANUS, *n. sp.*

Width of branches varying according to distance from the base; non-celluliferous side rounded, just below the bifurcations somewhat flattened, on the specimens observed the branches are smooth; cells tubular, cylindrical, arising just within the non-celluliferous surface of the branch; for a portion of their length they are essentially parallel with the surface, then turning abruptly, and frequently opening directly outward; cell-apertures circular or slightly oval, diameter .25 mm., irregularly disposed, sometimes forming transverse rows, the elevated margins of the apertures, forming the rows, are in contact, margins of apertures strong; frequent maculæ .50 mm. in diameter, destitute of apertures.

Locality—Falls of the Ohio river.

THAMNISCUS MULTIRAMUS, *n. sp.*

Bifurcations occurring at intervals of from two to five mm.; many of the branches cease growth after one or two bifurcations; width of branches from .5 to 1.50 mm., sometimes equally bifurcating, at other times one branch is much the smaller; non-celluliferous side gently rounded or flattened, finely striated; cell-apertures circular, diameter .15 mm.

Locality—Schoharie, N. Y.

CYSTOPORA, *nov. gen.*

Bryozoum consisting of simple or branching sub-cylindrical stipes, cells arising from the axis, circular and sub-cylindrical below, enlarging above the middle of their length, and becoming ampullate, turning abruptly outward below the apertures, which are extremely contracted; cell tubes exposed for more than half their length.

CYSTOPORA GENICULATA, *n. sp.*

Length of tubular cells two mm., for the space of one mm. nearly parallel with the axis of the branch, the walls of one-half of the tube being exposed; at a short distance from the aperture the tube is constricted, abruptly turning and continuing at right angles to the former portion; diameter of widest portion of tube .50 mm., of the narrowest .18 mm.; diameter of branch one mm.; cells alternating, imbricating and forming spiral rows.

Locality—Falls of the Ohio river.

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CLONOPORA, *nov. gen.*

Bryozoum consisting of an aggregation of elongate cylindrical tubular cells, which at more or less regular intervals become entirely free and turn abruptly outwards in an umbelliform expansion or in alternation ; cell apertures expanded or narrowly trumpet-shaped.

CLONOPORA SEMIREDUCTA, *n. sp.*

Ramose; diameter of branches one mm., composed of an aggregation of tubular cells, commencing at the axis of the branch, essentially parallel with the axis till within about one mm. from the aperture, when they turn abruptly and continue at right angles to the previous portion, length 2.50 mm.; some of the specimens consist simply of an aggregation of cell-tubes, but some others have apparently an intercellular substance.

Locality—Falls of the Ohio river.

CLONOPORA INCURVA, *n. sp.*

Consisting of an aggregation of cylindrical tubular cells which gradually increase in size to the aperture, eight or ten tubes commencing growth at the same point; at a distance of 1.50 mm. from the aperture, the tube turns quite abruptly and continues at nearly right angles to the former portion; the apertures are spirally arranged; the group of cells being umbel-like, and the bryozoum consisting of a succession of the umbelliform groups of cell-tubes.

Locality—Manlius, N. Y.

CRISINA, *d'Orbigny.*

CRISINA ? SCROBICULATA, *n. sp.*

Branches frequent; transverse section oval; celluliferous on one side; apertures small, circular, arranged in oblique ascendant rows from the middle of the branch, the two series of rows alternating, prominent, elevated, extending beyond the side of the branch; apertures .25 mm. in diameter, intercellular space occupied by polygonal pits; non-celluliferous side finely and irregularly striated

Locality—New York.

FENESTELLA (*Miller*), *Lonsdale.*

FENESTELLA CULTELLATA, *n. sp.*

Infundibuliform with frequent elongate processes ; branches varying in width from .50 to 1.50mm.; on non-celluliferous side rounded or subangular, occasionally nodose; dissepiments about .35 mm. in

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width, depressed, fenestrules varying from elongate oval to circular, length .75 mm.; cells in from three to six ranges, 18 in the space of five mm., along the middle of the branch is a row of thin elevations.

Locality—Falls of the Ohio river.

FENESTELLA QUADRANGULARIS, *n. sp.*

Infundibuliform; branches from .50 to one mm. in width on non-celluliferous side, angular, nodose; dissepiments from one-half to two-thirds the width of the branches; on non-celluliferous side angular and carinated; fenestrules, oval; length .75 mm.; cells in from three to six ranges; apertures circular, 18 in five mm.; margins elevated, occasionally near base celluliferous side nodose.

Locality—Falls of the Ohio river.

FENESTELLA ACULEATA, *n. sp.*

Infundibuliform; branches from .50 to .65 mm. in width; non-celluliferous side rounded, flattened just below bifurcations, with numerous, prominent, irregularly arranged nodes; dissepiments from one-half to equal width of the branches; fenestrules oval or subquadrangular, length .65 mm.; width .50 mm.; cells in from two to four ranges; apertures circular or oval, 16 in the space of five mm.; between the ranges of apertures are numerous sharp conical spines.

Locality—Falls of the Ohio river.

FENESTELLA SUBMUTANS, *n. sp*

Infundibuliform; lax; branches 35 to .50 mm. wide; on non-celluliferous side, round or angular; dissepiments from .25 to .55 mm. in width, rounded, depressed, fenestrules variable, usually subquadrangular, length 1 mm.; width from .25 to .75 mm.; cells in from two to four ranges; apertures circular, 18 in the space of 5 mm.; ranges separated by granulose ridges.

Locality—Falls of the Ohio river.

FENESTELA LINEANODA, *n. sp.*

Infundibuliform; branches from 50 to one mm. wide; non-celluliferous side angular, slightly carinated, with strong conical nodes; dissepiments .30 mm. wide, frequently carinated; fenestrules elongate oval or subquadrangular, width from .50 to .65 mm., length twice the width; cells in from two to four ranges; apertures circular, ranges of apertures separated by a thin ridge.

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FENESTELLA ROBUSTA, *n. sp.*

Infundibuliform: width of branches from. 65 to 1.50 mm.; non-celluliferous side, in well-preserved specimens, angular or subangular, with slight carina and minute nodes; dissepiments .65 of one mm. in width; non-celluliferous side rounded or subangular; fenestrules, on non-celluliferous side broadly oval, length one mm. oncelluliferous side elongate-oval; cells in from four to seven ranges; apertures circular, 18 in the space of five mm.

Localities—Ontario, Canada; and New York.

FENESTELLA PROPRIA, *n. sp.*

Infundibuliform; lax, branches very gradually increasing in width, from .65 to one mm., on non-celluliferous side broadly angular with a prominent sinuous carina along the middle; dissepiments .30 mm. in width, angular, carinated; fenestrules subquadrangular or broadly oval; length from 1.25 to 2.75 mm.; width from .80 to 1 mm., cells in from two to five ranges, apertures minute circular, 14 in the space of five mm.

Locality—Near Buffalo, N. Y.

FENESTELLA LARGISSIMA, *n. sp.*

Infundibuliform, irregular; width of branches, 1.5 to 2.5 mm., rounded or angular, dissepiments, 1.5 mm. in width; fenestrules irregular in size and shape, generally oval or subquadrangular; length from 2.5 to 5 mm.; width from one to two mm.

Locality—New York.

FENESTELLA RIGIDA, *n. sp.*

Infundibuliform, compact; width of branches from .5 to 1.5 mm.; on non-celluliferous side angular, slightly carinated; dissepiments one-half the width of the branches, angular, carinated on non-celluliferous side. Fenestrules broadly oval, width equal to, or a little more than, the width of the branches. Cellules in from two to six ranges; apertures circular, margins elevated; ranges separated by a prominent ridge.

Locality—Thompson Lake, Albany county, N. Y.

FENESTELLA STRIATOPORA, *n. sp.*

Infundibuliform, compact, width of branches from .25 to .65 mm., on non-celluliferous side, angular, with a slight carina along the middle, having frequent strong nodes; dissepiments, .5 mm. in width; fenestrules oval, length, from .65 to .75 mm., width, .5 mm.; cellules

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in from three to five ranges; apertures circular, twenty-five in the space of five mm., arranged in longitudinal rows, margins very strong oblique resembling ridges.

Locality—Falls of the Ohio river.

FENESTELLA DISTANS, *n. sp.*

Infundibuliform, large; width of branches from .5 to 1.3 mm., on non-celluliferous side, branches angular, below bifurcations, flattened, sometimes carinated and nodose; dissepiments, .5 mm. in width, rounded or angular; fenestrules subquadrangular, length, 2.75 mm., width, to 1.3 mm.; cellules in from three to seven ranges; apertures circular, fourteen in the space of five mm.; longitudinal ranges of apertures are separated by a narrow carina; there are also elongated conical nodes, which occur at irregular but frequent intervals.

Locality—Near Buffalo, N. Y.

FENESTELLA FLABELLIFORMIS, *n. sp.*

Flabelliform, width of branches from .6 to 1 mm; dissepiments .50 mm. in width, frequently oblique to the branches; fenestrules subquadrangular, 2.3 mm. in length, 1 mm. in width; cellules in three and four ranges, sixteen in the space of five mm.

Locality—Shortsville, near Manchester, N. Y.

FENESTELLA PERANGULATA, *n. sp.*

Broadly infundibuliform; width of branches from .5 to 1 mm.; on non-celluiiferous side angular, slightly carinated; just below the bifurcations on carina is a small conical node; dissepiments, .35 mm. in width; fenestrules usually subquadrangular; length from .75 to 1 mm.; width, .65 mm.; cellules in from two to four ranges; apertures circular or oval, opening obliquely, eighteen apertures in the space of five mm.; ranges sometimes separated by a ridge.

Locality—New York.

FENESTELLA CELSIPORA, *n. sp.*

Bryosoum infundibuliform, broadly expanding, usually broadly plicated in the direction of the branches; inner face of the frond celluliferous; branches moderately strong, very gradually increasing in size to the bifurcations which occur at intervals of from fifteen to forty mm. Dissepiments on non-celluliferous side from .25 to .35 of one mm. in width and nearly on a plane with the branches; on the celluliferous side narrower, angular or slightly carinate. Cellules in from two to five ranges; apertures circular or oval, opening obliquely

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backward or toward the base, about 18 in the space of 5 mm., margins elevated, the upper side more decidedly than the lower; space between ranges of apertures smooth or marked by longitudinal ridges, the latter feature being more conspicuous where there are only two ranges of cell-apertures.

Locality—Upper Helderberg group, Canada West.

FENESTELLA CELSIPORA, *var.* MINOR, *n. var.*

Infundibuliform, frequently plicated; branches ridged, width from .25 to .50 mm., on non-celluliferous side branches angular or subangular, dissepiments .20 mm. in width, fenestrules generally subquadrangular, sometimes oval, length .50 mm., width .33 mm.; cellules in from two to four ranges; apertures small, circular, twenty-five in the space of .5 mm., very prominent.

Locality—Canada West.

FENESTELLA CELSIPORA, *var.* MINIMA, *n. var.*

Cup shaped; width of branches from .25 to .50 mm., bifurcations irregular; dissepiments from two-thirds of slightly more than the width of the branches, on non-celluliferous side sometimes elevated above the plane of the branches, continuing across the branches and forming elevations more prominent than the branches; fenestrules broadly oval, or circular, length from .25 to .50 mm., width equal to or greater than the length; cellules in from two to four ranges; apertures circular, prominent, distinctly longitudinally disposed, twenty-five in the space of .5 mm.

Locality—Falls of the Ohio river.

FENESTELLA CYLINDRACEA, *n. sp.*

Infundibuliform; width of branches from .35 to .66 mm., on non-celluliferous side, angular, carinated; dissepiments .25 mm. in width, rounded, subangular, angular or carinated; fenestrules oval, length .90 mm., width .35 to .50 mm.; cells in from two to four ranges; apertures circular, oval, eighteen in space of 5 mm., longitudinally arranged, margins unequally elevated.

Locality—Near Buffalo, N. Y.

FENESTELLA BISERIATA, *n. sp.*

Infundibuliform; width of branches from .38 to .50 mm. on non-celluliferous side rounded, striated; dissepiments, less than one-half as wide as the branches; fenestrules, subquadrangular, the ends straight, the sides rounded, width from one and one-half to two times the width of the branches, length twice the width, cells in two ranges;

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apertures circular, four and sometimes five in the space of a fenestrule; middle of branch carinated.

Locality—Cherry Valley, N. Y.

FENESTELLA ADNATA, *n. sp.*

Infundibuliform; width of branches from .35 to .50 mm., on non-celluliferous side, sharply rounded or subangular, sinuous finely carinated; dissepiments, equaling or wider than the branches; branches sometimes anastomosing; fenestrules on non-celluliferous side circular, on celluliferous side oval, length .66 mm.; cells in from two to four ranges; apertures circular, twenty-five in the space of five mm., margins very strong. The margins of adjacent apertures frequently unite and are prolonged, forming a short spine.

Locality—Falls of the Ohio river.

FENESTELLA NEXA, *n. sp.*

Infundibuliform; width of branch from .50 to .75 mm.; on non-celluliferous side the branches are, when perfect, angular; dissepiments, on non-celluliferous side .50 mm. in width, on celluliferous side contracting midway between the branches to .25 mm., depressed, carinated; fenestrules, subquadrangular or broadly oval, length 1.25 mm., width .75 mm.; cells in from two to four ranges, apertures circular, 16 in the space of 5 mm., longitudinally arranged; ranges separated by a strong, continuous ridge.

Locality—Canada West.

FENESTELLA MUTABILIS, *n. sp.*

Infundibuliform, broadly spreading; width of branches, near base, .33 to .65 mm., above, from .65 to 1 mm.; on non-celluliferous side, near base, a slight carina along the middle; at a greater distance from the base there are three or four strong striations; dissepiments, from .33 to .50 mm. in width, on the upper portion of the frond sometimes one mm., angular and carinated, or gently rounded without carination; fenestrules on the non-celluliferous side oval or oblong, length from .65 to 1 mm., width, .50 mm., but somewhat varying; cells in two and three ranges, apertures small, circular, seventeen in the space of five mm., arranged in distinct longitudinal lines; margins thin, distinctly elevated.

Locality—Canada West.

FENESTELLA POROSA, *n. sp.*

Infundibuliform, conical; branches straight, width from .50 to .90 mm.; in well-preserved specimens the branches are angular, carinated;

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dissepiments, slightly less than .50 mm. in width, on non-celluliferous side angular, carinated; on celluliferous side, depressed, angular, carinated; fenestrules broadly oval or subquadrangular, width, from .50 to .65 mm., length, one and one-half times the width, on celluliferous side, elongate oval, cells in from two to four ranges; apertures circular, distinctly arranged longitudinally, central range prominent.

Locality—Canada West.

FENESTELLA PARALLELA, *n. sp.*

Infundibuliform, large; width of branches from .30 to .45 mm.; on non-celluliferous side angular, with thin, sharp carina; dissepiments slender, .18 mm. wide, angular, carinated on celluliferous side curved, the curvature toward the base; fenestrules oval, or subquadrangular, length .65 mm., width .25 mm., on celluliferous side, elongate oval; cell-apertures in two ranges, except immediately below the bifurcations, 18 in the space of five mm., margins thin, elevated; space between longitudinal ranges of apertures elevated and having a row of strong conical nodes.

Locality—New York.

FENESTELLA BREVISULCATA, *n. sp.*

Infundibuliform; width of branches from .65 to .90 mm.; on non-celluliferous side, angular or subangular, flattened just below the bifercations where there is a short shallow channel, occasionally carinated, usually nodose, a strong line of nodes along the middle; dissepiments, .30 mm. wide, on celluliferous side rounded, on non-celluliferous side carinated; fenestrules oval or subquadrangular, length 1.50 mm. width .80 mm., occasionally narrower; cells in from two to four ranges, usually three; apertures circular, 16 in the space of five mm., arranged longitudinally, margins thin, elevated.

Locality—Canada West.

FENESTELLA GRANILINEA, *n. sp.*

Infundibuliform; branches nearly parallel; width of branches from .35 to .65 mm.; acutely angular, with from one to four lines of nodes along the middle, the central range always the strongest; dissepiments from .25 to .30 mm. in width, on non-celluliferous side very angular, prominent, non-celluliferous side, rounded, carinated; fenestrules oval or subquadrangular, length, usually .75 mm., width from .35 to .48 mm.; cells in two and three ranges, apertures circular, 15 in the space of five mm.; margins distinctly and equally elevated. When three

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ranges occur the intervening space is smooth, when two ranges occur they are separated by ridges.

Locality—Canada West.

FENESTELLA PERUNDATA, *n. sp.*

Infundibuliform, strongly undulating on a line with the branches; width of branches from one to 1.50 mm., angular and in well-preserved specimens slightly carinated; dissepiments or anastomosed portions; equaling or greater than the width of the branches; fenestrules varying from elongate to broadly oval, width equal to or a little more than the width of the branch, length one and one-half times the width of the branch; cells in from three to six ranges, apertures circular arranged in sinuous longitudinal rows, 16 in the space of five mm.

Locality—Canada West.

FENESTELLA HEXAGONALIS, *n. sp.*

Infundibuliform, broadly spreading; width of branches from .50 to one mm.; angular, slightly carinated, sometimes connected by dissepiments, at other times anastomosing, when anastomosing decidely zig-zag, dissepiments or anastomosed portion .66 mm. in width; on celluliferous side the branches are regularly sinuous, never zig-zag; fenestrules, from .65 to one mm. wide, length to one and one-half times the width; cells in from two to four ranges, arranged in longitudinal sinuous rows, 17 apertures in the space of five mm.; below bifurcations a triangular space without apertures.

Locality—Canada West.

FENESTELLA HEXAGONALIS *var.*, FORAMINULOSA, *n. var.*

On the celluliferous side of the branches, at irregular but frequent intervals, are prominent nodes, apparently formed by the coalescing and elevation of adjoining cell apertures, having a height of .25 mm.; diameter at the base, .35 mm.

Locality—Canada West.

FENESTELLA LEVINODATA, *n. sp.*

Infundibuliform, branches strong; bifurcations occurring at intervals of from 5 to 20 mm., branches sometimes straight, usually more or less sinuous and sometimes decidedly zig-zag; dissepiments from two-thirds to equal the width of the branches, fenestrules somewhat variable, but usually oval or obscurely hexagonal, length, one mm.,

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width from .60 to .95 mm.; cells in from three to five ranges, in longitudinal sinuous rows; apertures circular, twenty in the space of five mm.

Locality—Falls of the Ohio river.

FENESTELLA ANGULATA, *n. sp.*

Width of branches from .33 to .50 mm.; the branches are round or subangular, finely striated; dissepiments, from one-third to one-half the width of the branches, sometimes oblique to the branches, at times curving; fenestrules rectangular or rhomboidal, two mm. in length, and from .50 to .80 mm. in width; cells in two ranges; apertures circular, longitudinally arranged, eighteen in the space of five mm.; space between the ranges of apertures elevated and slightly carinated.

Locality—New York.

FENESTELLA VARIAPORA, *n. sp.*

Infundibuliform, base thin, spreading; pedicel, short; width of branches from .25 to .30 mm.; branches without nodes or striations; dissepiments equal to the width of the branches, on non-celluliferous side, rounded or subangular, occasionally faintly carinate; dissepiments, from broadly oval to circular, sometimes hexagonal, width, one and one-half times that of the branches; cells in two ranges; apertures circular, thirty in the space of five mm.; space between the ranges of cells elevated, with conical nodes.

Locality—Falls of the Ohio river.

FENESTELLA SERRATA, *n. sp.*

Infundibuliform; width of branches from .25 to .35 mm.; on non-celluliferous side branches nodose; nodes strong, at irregular distances apart, branches also sometimes spinose, sometimes granulose; dissepiments, two-thirds the width of the branches, occasionally having a strong oblique node; fenestrules oval or subquadrangular; length .50, width .25 to .50 mm., on non-celluliferous side elongate oval; cells in two ranges, circular, twenty-two in the space of five mm.; branches on celluliferous side carinated, carina with prominent tri-angular nodes.

Locality—Falls of the Ohio river.

FENESTELLA STELLATA, *n. sp.*

Infundibuliform; width of branches from .35 to .50 mm., branches rounded with comparatively strong oblique nodes, also granulose; dissepiments, from one-half to two-thirds the width of the branches; fenestrules oval or subquadrangular, length 65, width from .25 to .50

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mm.; cells in two ranges twenty in the space of 5 mm.; space between ranges a nodose elevation, nodes strong and variable.

Locality—Falls of the Ohio river.

FENESTELLA PERTENUIS, *n. sp.*

Infundibuliform, width of branches from .20 to .25 mm., non-celluliferous side sharply rounded with low conical nodes; dissepiments, a little less than the width of the branches; fenestrules quadrangular, length .35, width .25 mm., on celluliferous side .20 mm.; cells in two ranges apertures circular, twenty-eight in the space of 5 mm.; space between ranges one-third the width of branch, elevated, with prominent conical nodes.

Locality—Falls of the Ohio river.

FENESTELLA SINGULARIS, *n. sp.*

Infundibuliform; width of branches from .35 to .50 mm., on non-celluliferous side rounded, with from three to five rows of granules and occasional spines, immediately below each bifurcation is a strong node or spine; dissepiments, from .25 to .35 mm. wide, sometimes oblique to the branch; fenestrules, oval or subquadrangular, length, .50; width, .35 mm.; cells in two ranges; apertures circular, twenty in the space of 5 mm.; space between ranges one-third the width of branches, elevated, occasionally spinose.

Locality—Falls of the Ohio river.

FENESTELLA CURVIJUNCTURA, *n. sp.*

Width of branches from .20 to .50 mm.; shape varying from nearly flat to acutely angular, sometimes having strong conical nodes; dissepiments from two-thirds to three-fourths the width of the branch, frequently curved, nodose; fenestrules, subquadrangular, length .25, width .20 to .25 mm.; cells in two ranges; apertures circular, twenty-five in 5 mm., space between ranges, elevated, having conical nodes equal in number to cells.

Locality—Falls of the Ohio river.

FENESTELLA CULTRATA, *n. sp.*

Infundibuliform; width of branches from .50 to .80 mm., round or angular, with fine obscure granulose striæ; dissepiments, .30 to .68 mm. wide; fenestrules usually subquadrangular, usual length .2 mm., width from .25 to 1 mm.; cells in two ranges; apertures large, sixteen to eighteen in 5 mm.; branch carinated, carina broad at base, concealing apertures, narrowing above and sharp at the summit.

Locality—Falls of the Ohio river.

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FENESTELLA TORTA, *n. sp.*

Infundibuliform, delicate; pedicel 4 mm. in length and, in the specimens observed, twisted; width of branches from .20 to .25 mm., below a bifurcation from .35 to .50 mm.; on non-celluliferous side rounded or subangular, slightly carinated; dissepiments .50 mm. in width, much expanded; fenestrules usually oval, sometimes circular, length .50, width from .33 to .50 mm.; cells in two ranges, twenty-four in 5 mm.; margins of apertures strong, frequently touching one another; space between ranges carinated, carina thin, .50 mm. in height.

Locality—Falls of the Ohio river

FENESTELLA BISERRULATA, *n. sp.*

Infundibuliform; branches strong, on non-celluliferous side rounded or subangular, frequently flattened opposite the dissepiments, or slightly concave on the summit, regularly granulose; dissepments .50 mm. in width; fenestrules oval, width from .80 to 1 mm., width from .35 to .65 mm.; cells in two ranges, apertures circular, 18 in the space of 5 mm.; middle of branch carinated, height of carina .50 mm., thin, expanding to .33 mm.; then contracting, summit sharp; on margins of widened portions are minute nodes or spines corresponding in number to the apertures.

Locality—Falls of the Ohio river.

FENESTELLA PERMARGINATA, *n. sp.*

Infundibuliform; branches from .25 to .40 mm. in width; dissepiments, from .60 to .95 mm. wide; fenestrules oval, length .75 mm., width from .50 to .75 mm.; cells in two ranges, 20 in the space of .5 mm., middle of branch carinated, height of carina .95 mm., at about half the height expanded, then contracted, the summit sharp; at the edge of the expanded portion is a row of conical nodes.

Locality—Falls of the Ohio river.

FENESTELLA DEPRESSA, *n. sp.*

Infundibuliform; width of branches from .25 to .35 mm.; angular on celluliferous side; on non-celluliferous side, rounded, striated, from three to six striæ on a branch, also nodose; dissepiments one-third the width of the branch; fenestrules subquadrangular; length from one and one-half to two times the width; cells in two ranges, apertures circular, 20 in five mm., middle of branch angular, elevated.

Locality—Falls of the Ohio river.

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FENESTELLA ÆQUALIS, *n. sp.*

Width of branches from .25 to .35 mm.; on non-celluliferous side angular, slightly carniated; dissepiments, varying from two-thirds of to equal the width of the branches; fenestrules usually subquadrangular, length .75 mm.; width from .60 to .75 mm.; cells in two ranges, apertures circular, space between ranges elevated, angular nodose.

Locality—Clarence Hollow, N Y.

FENESTELLA LUNULATA, *n. sp.*

Infundibuliform; width of branches from .25 to .50 mm.; dissepiments equal in width to the branches, generally on the non-celluliferous side a semicircular ridge extending on the branches and at the middle of the dissepiments a strong oblique spine, projecting over the fenestrules; fenestrules variable, frequently oval, width equal to that of the branches; length one and one-half times the width; cells in two ranges, apertures sometimes oblique, 22 in 5 mm., space between ranges carinated, carinæ thin, elevated from .35 to .50 mm., then expanding, the expansions .20 mm. wide.

Locality—Falls of the Ohio river.

FENESTELLA LATIJUNCTURA, *n sp.*

Branches on non-celluliferous side very irregular, width from 1 to 1.50 mm., nodose, nodes irregular in size and appearance, sometimes one mm. high, frequently oblique, sometimes there is a thin sharp carina with elevations; dissepiments one mm. in width, fenestrules oval, width equal to that of the branches, and from one-half to two-thirds the length; cells in two ranges, apertures circular, 18 in 5 mm. middle of branch carinated, one mm. in height at one-third the distance above the branch; expanded, width of expansion .25 mm., then contracting, the expanded portion having on its margin nodes equal in number to the apertures.

Locality—Falls of the Ohio river.

FENESTELLA BI IMBRICATA, *n. sp.*

Width of branches, 34 mm.; on non-celluliferous side very irregular; dissepiments, one mm. or more in width, on non-celluliferoous side, the summit elevated, continuing on the branches, forming a prominent semicircular elevation around the lower portion of fenestrule; fenestrules nearly circular, diameter .50 mm., sometimes subtriangular; cells in two ranges; apertures circular, 22 in the space of 5 mm.; carina attaining a height of .50 mm., then abruptly expand-

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ing, the expansion mostly on one side, its width from .33 to .65 mm., overlapping.

Locality—Falls of the Ohio river.

FENESTELLA RHOMBIFERA, *n. sp.*

Infundibuliform; width of branches from .30 to .50 mm., on non-celluliferous side rounded or angular, slightly carinated nodose, sinuous or zig-zag. The branches are sometimes connected by dissepiments; when zig-zag, connected by anastomosis; width, .65 mm.; fenestrules broadly oval or circular, height, .75, width, .65 mm. on celluliferous side more elongate oval; cell-apertures in two ranges, circular, fourteen in the space of five mm.; carina expanding from the base, at a point miway from the summit it reaches its greatest expansion, equal in width to the branches.

Locality—Leroy, Genesee county, N. Y.

FENESTELLA SEMIROTUNDA, *n. sp.*

Regular on celluliferous side; irregular on non-celluliferous side; width of branches, .42 mm., angular, slightly carinated, zig-zag or straight; dissepiments .65 mm. in width; fenestrules, from oval to circular; width, from a little less than, to twice the width of the branches; cell-apertures in two ranges, circular, twenty in five mm; height of carina equal to diameter of branch, base thin, at half the height expanding to .35 mm. in width, then contracting; at the margin of the expanded portions are conical nodes, also, at irregular intervals, strong, flat, semicircular projections.

Locality—Falls of the Ohio river.

FENESTELLA INTERRUPTA, *n. sp.*

Branches irregular on non-celluliferous side; width, 40 mm.; carinated, zig-zag; dissepiments, .65 mm in width, sometimes elevated above the branches, connecting and forming strong, irregular elevations; fenestrules on celluliferous side regularly oval, on non-celluliferous side usually circular; diameter, 50 mm.; cell-apertures in two ranges, circular, twenty-four in 5 mm.; carina .50 mm. in height, summit expanded, having a width from 25 to .50 mm.

Locality—Falls of the Ohio river

FENESTELLA ERECTIPORA, *n. sp.*

Branches on non-celluliferous side sometimes irregular, gently rounded to angular, straight to zig-zag, sometimes carinated, always prominently nodose, frequently anastomosing, width, from .50 to .75

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mm.; dissepiments on anastomosed portions, .80 mm. wide; fenestrules varying from oval to circular; length, .90 mm; cells in two ranges, immediately below each bifurcation there is an additional cell; fourteen in five mm.; carinated.

Locality—Canada West.

FENESTELLA (HEMITRYPA) GRANIFERA, *n. sp.*

Width of branches from .20 to one mm.; flattened, rounded or subangular; slightly elevated carinæ, the carinæ and at times other portions of branches minutely granulose; dissepiments 90 mm. wide, much expanded; fenestrules broadly oval, length .90, width .66 mm.; cell-apertures in two ranges fifteen in 5 mm.; carina at first very slender, enlarging midway to the summit, then contracting; probably connected by lateral bars.

Locality—Falls of the Ohio river.

FENESTELEA (HEMITRYPA) PERPLEXA, *n. sp.*

Width of branches from .20 to .65 mm., gently rounding to subangular with small but very distinct nodes; dissepiments from .20 to .30 mm. in width; fenestrules from regularly oval to circular or obscurely hexagonal, length, .50, width .33 mm.; cell-apertures in two ranges twenty-two in 5 mm., space between very thin, sharply elevated, having on the summit nodes projecting beyond the sides of the carinæ, having the appearance of broken lateral bars.

Locality—Falls of the Ohio river.

FENESTELLA (HEMITRYPA) ACAULIS, *n. sp.*

Width of branches from .25 to .35 mm., rounded or slightly angular, slightly carinated, minutely nodose; dissepiments having a width equal to or greater than the branches on non-celluliferous side, sometimes elevated above the branches, connecting and forming prominent angular elevations; fenestrules subquadrangular, broadly oval, circular, obscurely hexagonal, length .50 mm.; cell-apertures in two ranges, slightly oval, twenty-five in 5 mm.; carina thin, height equal to that of branch, for one-half the height thin, then expanding; width of the summit one-half that of branch; carinæ connected by bars, twenty-two in 5 mm.

Locality—Falls of the Ohio river.

FENESTELLA (HEMITRYPA) STIPATA, *n. sp.*

Branches straight to zig-zag, width .25 to .35 mm. regular, carinated; dissepiments same width as branch, sometimes forming con-

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tinuous elevations; fenestrules, from .25 to .50 in length, width from .12 to .35 mm.; cell-apertures in two ranges, circular, twenty in 5 mm.; carina .90 mm. in height, for half the height thin, then expanding, width of summit, .35 mm., connected by oblique lateral bars, thirteen in the space of five mm.

Locality—Falls of the Ohio river.

FENESTELLA (HEMITRYPA) TEGULATA, *n. sp.*

Width of branches .35 mm., acutely rounded or subangular, slightly carinated, nodose, straight or zig-zag; dissepiments, from equal to a little more than the width of the branches, sometimes elevated above and extending across the branches; fenestrules oval, length .55, width .33 mm.; cell-apertures in two ranges, circular, twenty four in five mm.; height of carina from .50 to .75 mm., expanding to midway to summit, then contracting, summit thin; the carina connected by lateral bars fifteen in 5 mm.; arcuate.

Locality—Falls of the Ohio river.

FENESTELLA (HEMITRYPA) LATA, *n. sp.*

Width of branches from .20 to .50 mm., rounded or angular, rigid, straight or zig-zag; dissepiments from .50 to .75 mm., sometimes elevated above and extending across the branches; fenestrules, length 75 mm., width .50 mm. Cell-apertures in two ranges circular or oval, sixteen in the space of five mm., carina one mm. in height or half the height, thin, then slightly expanding, connected by lateral bars, twelve in the space of five mm.

Locality—Canada West.

FENESTELLA (HEMITRYPA) ANONYMA, *n. sp.*

Width of branches from .30 to .50 mm., angular, slightly carinated on non-celluliferous face, near bifurcation rounded or gently concave; the carina is replaced by two or three striations as the branch widens; dissepiments .14 mm. in width. Fenestrules usually oval, length .33, width .22 mm.; cells in two and three ranges, the latter number for only a short distance below the bifurcations; apertures circular, twenty-two in five mm., carina expanding for one-half the height, height .50 mm., width of expanded part .10 mm., connected by lateral bars, twenty in the space of five mm.

Locality—Falls of the Ohio river.

FENESTELLA (HEMITRYPA) PERNODOSA, *n. sp*

Width of branches .45 mm., wider opposite the dissepiments; dissepiments obscuring the continuity of the branches; branches angular,

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carinated, prominently nodose, sometimes striated; the branches frequently appear as slight elevations across the dissepiments which are apparently united; dissepments greatly expanded at the branches, carinated, nodose. Fenestrules oval, length .90 mm., width .60 mm. Cell-apertures in two ranges, with an additional aperture just below the bifurcations, circular, sixteen in the space of 5 mm.; carina thin, height .50 mm., connected by lateral plates extending to the summit of branches, oblique.

Locality—Canada West.

FENESTELLA (HEMITRYPA) SUBSTRIATA, *n. sp.*

Width of branches from .25 to. 50 mm., angular or subangular; dissepiments one-half to two-thirds the width of the branches. Fenestrules subquadrangular, length .75 mm., width .35 mm. Cell apertures in two ranges, circular, twenty in space of .5 mm. Carina at first thin, rapidly expanding to .35 mm., height .45 mm., connected by lateral bars, fourteen in 5 mm.

Locality—Falkirk, N. Y.

FENESTELLA (HEMITRYPA) ELEGANTISSIMA, *n. sp.*

Width of branches from .33 to .65 mm., rounded to angular, linearly nodose; dissepiments, width one mm., much expanded at junction with the branches. Fenestrules elongate-oval, length 1.50 mm., width, 95 mm.; celluliferous side not observed.

Locality—Canada West.

FENESTELLA (HEMITRYPA) FAVOSA, *n. sp.*

Width of branches from .20 to .35 mm., subangular, slightly carinated. Fenestrules elongate-oval to subquadrangular, length to .45 mm., width .25 mm. Cell-apertures in two ranges, circular, twenty in the space of five mm. Carina having processes from each side, those of adjacent carinæ connecting midway between the carinæ forming a ridge, interstices generally hexagonal.

Locality—Canada West.

FENESTELLA (HEMITRYPA) CRIBROSA, *n. sp*

Width of branches from .25 to 50 mm., rounded, width of dissepiments .18 mm. Cell-apertures in two ranges, circular, sixteen in the space of five mm.; carina having lateral processes meeting midway between carinæ and uniting form a longitudinal ridge: interstices circular enclosed by a narrow elevation

Locality—Falls of the Ohio river

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FENESTELLA (HEMITRYPA) CONJUNCTIVA, *n. sp.*

Width of branches from .33 to .50 mm., immediately below bifurcation the width is .75 mm., rounded or subangular, carinated; below bifurcation flattened, from straight to zig-zag; the dissepiments have a width to .50 mm., fenestrules oval, length .95 mm., width .50 mm. Cell-apertures in two ranges, circular, sixteen in the space of 5 mm.; height of carina .55 mm., summit connected by lateral bars; bars and summit of carina having precisely the same appearance as the non-celluliferous side of some fronds, both summit and processes carinated.

Locality—Canada West.

FENESTELLA (HEMITRYPA) FASTIGATA, *n. sp.*

Width of branches from .33 to .65 mm., angular, carinated; carina strong; around each fenestrule there is a narrow elevation; width of dissepiments .40 mm. Fenestrules oval, length about .50 mm., width .33 mm. Cells in two ranges, apertures comparatively large, opening laterally; space between the ranges of apertures carinated; carinæ at base very thin, expanding above, height .45 mm.; connected by lateral processes consisting of very thin plates.

Locality—Falls of the Ohio river.

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BRYOZOANS OF THE HAMILTON GROUP.

(Including only the genera preceding the Fenestellidæ.)

PALESCHARA, *Hall.*

PALESCHARA INTERCELLA, *n. sp.*

Foliaceous expansions; cells polygonal, in contact; diameter .33 mm.; maculæ numerous, slightly elevated, centers distant 5 mm., their cells larger than others; between the cells are cellules equal in number to the cells, quadrangular, square or triangular; diameter .17 mm; cells sometimes circular, walls with triangular spines.

Locality—York, New York.

PALESCHARA RETICULATA, *n. sp.*

Foliate expansions; cells polygonal, in contact; diameter .25 mm., frequently arranged in undulating, intersecting rows; in this arrangement the cells are quadrangular, giving to the frond a reticulate appearance; centers of maculæ distant 3 mm., slightly elevated and composed of larger cells, which in perfect specimens were probably partially hooded.

Locality—York, New York.

PALESCHARA VARIACELLA, *n. sp.*

Foliaceous expansions; cells in contact, usually hexagonal; diameter .25 mm.; centers of maculæ distant 6 mm., composed of larger cells; diameter .80 mm; cell walls with strong angular spines; no intermediate cellules.

Locality—York, New York.

PALESCHARA AMPLECTENS, *n. sp.*

A thin expansion, usually encrusting crinoid stems; cells polygonal, in contact, irregularly disposed; diameter .20 mm.; no maculæ; frequent nodes or spines.

PALESCHARA ? (LICHENALIA ?) PERTENUIS, *n. sp.*

Foliaceous expansions; greatest thickness observed, .20 mm.; cells usually circular or oval, sometimes polygonal; some portions of walls

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in contact, diameter .33 mm.; maculæ not elevated, somewhat obscure, composed of larger oval cells, having a length of .50 mm.; there are minute intermediate cellules or pits, varying in number, sometimes entirely surrounding a large cell.

Locality—Lodi Landing, New York.

TREMATOPORA, *Hall.*

Trematopora scutulata, *n. sp.*

Ramose, solid; branches widely diverging; diameter .66 mm.; cells tubular cylindrical; apertures oval, margins parallel with surface; length .25 mm., arranged in longitudinal parallel rows and oblique transverse rows; oblique arrangement most conspicuous; at the base of each aperture is a strong node or spine, longitudinal rows separated by ridges; ridges coalescing between apertures, giving to the apertures the appearance of being separated by strong oblique ridges, crossing and forming elongate diamond-shaped apertures.

Locality—Hamburg, Erie county, New York.

Trematopora transversa, *n. sp.*

Ramose, solid; branches widely diverging; diameter 2 mm.; cells tubular, cylindrical; apertures oval, parallel with surface; length .25 mm., closely arranged in oblique transverse rows; apertures without elevated margins; space between apertures elevated, with a single row of granules.

Locality—Hamburg, Erie county, New York.

Trematopora polygona, *n. sp.*

Ramose, solid; branches widely diverging; diameter 1.25 mm.; cells tubular; apertures oval, very closely arranged; space between them narrow, elevated, angular, appearing as walls of cells, making the apertures apparently polygonal; length .40 mm., width .25 mm.; at each angle a conical node, the elevations frequently granulose.

Locality—Hamburg, New York.

Trematopora tortalinea, *n. sp.*

Ramose; branches distant; diameter .60 mm., frequently sinuous; cells tubular, sub-cylindrical; apertures oval; length .25 mm., width .12 mm., arranged in longitudinal rows, alternating and forming oblique rows; longitudinal rows frequently separated by a ridge, which,

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owing to the sinuous branches, frequently presents a twisted appearance; the ridge is granulose, giving a serrated aspect.

Locality—Hamburg, New York.

TREMATOPORA SUBQUADRATA, *n. sp.*

Ramose, solid; branches infrequent, diameter 1 mm.; cells tubular; apertures oval; length .33 mm., arranged in longitudinal and in oblique rows, the latter arrangement the most prominent; occasionally irregularly disposed; intermediate space elevated, quadrangular or polygonal, minutely striated; at each angle is a comparatively strong node.

Locality—Darien, New York.

TREMATOPORA PERSPINULATA, *n. sp.*

Ramose, solid; branches infrequent; diameter 3 mm.; cells tubular, apparently angular, contiguous; apertures varying from elongate-oval to nearly circular, some having a length of .35 and a width of .16 mm.; others are circular; diameter .30 mm., irregularly and very closely disposed, without elevated margin; space between flat or little elevated, with a slight carina, or granulose, with numerous irregularly disposed conical nodes or spines, forming the most prominent feature of the surface.

Locality—York, New York.

TREMATOPORA CLAVIFORMIS, *n. sp.*

Consisting of an erect frond 10 mm. in height, attached by a root; branching dichotomously; near the base the stem is round; diameter .75 mm.; the branches become flattened and widened to 2.25 mm., giving to the frond a clavate appearance. Cell-apertures polygonal, contiguous, somewhat longer than wide; length .33 mm., arranged in oblique rows, at an angle of forty-five degrees to the branch; cell walls thin; at the angles of the summit are minute spines.

Locality—Bellona, Yates county, N. Y.

TREMATOPORA ORBIPORA, *n. sp.*

Ramose, solid; branches infrequent; diameter 2 mm.; cells tubular, cylindrical; apertures usually oval or circular, and sometimes subangular from mutual pressure, diameter .40 mm., closely and regularly or irregularly disposed; the more or less oblique rows seem to be the most frequent arrangement of the apertures; both margin and

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intercellular space are granulose; sometimes the margins are in contact, coalescing, and forming elevated angular nodose ridges.

Locality—Canandaigua, N. Y

TREMATOPORA? GRANISTRIATA, *n. sp.*

Consisting of elongate stems with striated base, apparently simple, attached to foreign substances by wrinkled rootlets. The stem for 7 mm. is small, striated; cells tubular, cylindrical; apertures oval or circular; length .38 mm., arranged in longitudinal parallel rows, frequently alternating and forming oblique rows; space between longitudinal rows, with linear granulose striations; sometimes from mutual pressure the apertures are polygonal.

Locality—Darien, N. Y.

CALLOPORA, *Hall.*

CALLOPORA BISPINULATA, *n. sp.*

Ramose, solid; branches infrequent; diameter 1 mm., expanding and flattened before bifurcating; cells tubular, subcylindrical; apertures oval; length .35 mm., closely disposed, some portion of the margins of adjacent apertures in contact; sometimes in regular longitudinal and oblique rows, the margins having at each end a minute spine; space between apertures with minute pits; as the arrangement of the apertures vary, the bryozoan presents a very variable appearance.

Locality—Moscow, N. Y.

CALLOPORA HAMILTONENSIS.

Ceriopora? Hamiltonensis, Nicholson.

Ramose, solid; diameter 1 mm.; cell-apertures oval; length .25 mm., arranged in parallel longitudinal rows, alternating, and forming transverse oblique rows; margins slightly elevated; longitudinal ranges separated by a strong ridge; the transverse space between the apertures is occupied by two quadrangular pits.

Locality—Hamburg and New Berlin, N. Y.

CALLOPORA INTERNODATA, *n. sp.*

Ramose, solid; diameter 2 mm.; cells tubular, subcylindrical; apertures oval; length .33 mm., elevated margins frequently in contact, sometimes irregularly disposed, at other times arranged in transversely oblique parallel rows; intermediate space occupied by minute

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angular pits; there are also conical nodes, one or two at each aperture, forming the most prominent feature of the surface.

Locality—Darien, N. Y.

CALLOPORA HEMISPHERICA, *n. sp.*

Hemispheric masses; under surface a wrinkled epitheca; cells tubular, cylindrical, at the center at right angles to the base, becoming more and more oblique as they approach the margin; cell walls thin, septa wanting; apertures circular, very closely but irregularly disposed, diameter 50 mm.; margins thick, strongly elevated; intermediate space with angular pits varying in size and shape; maculæ gently rounded, with larger cell-apertures; interior intercellular space irregularly vesiculose, or composed of tubili with regular septa.

Locality—York, N. Y.

LICHENALIA, *Hall.*

LICHENALIA STELLATA, *n. sp.*

Expansions or masses; cells tubular, cylindrical; walls thin; septa infrequent; intercellular space vesiculose; cell-apertures circular, usually oblique to the surface; diameter .33 mm., quite regularly arranged in undulating intersecting rows, frequently alternating and subimbricating, sometimes presenting an arched or triangular appearance; centers of the maculæ depressed, smooth, distant 6 mm., bases contiguous; apertures near maculæ radiating, and presenting a stellate appearance.

LICHENALIA FOLIACEA, *n. sp.*

Apertures circular or oval, regularly alternating and imbricating; diameter .40 mm; the upper portion of the cell walls are sometimes exposed nearly their entire length, carinated, giving to the aperture a triangular appearance; maculæ distant 10 mm., elongate, without apertures, cell-apertures nearest the maculæ larger.

Locality—West Bloomfield, N. Y.

LICHENALIA CONSTRICTA, *n. sp.*

Expansions or masses; apertures circular, oblique to the surface, very closely disposed, on a portion of the surface the intermediate space is occupied by minute angular pits, on the highest portion of

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the wall is a projection extending over and constricting the aperture, maculæ slightly elevated, distant 5 mm.

Locality—Near Leroy, N Y.

LICHENALIA COLLICULATA, *n sp.*

Expansions or masses; cells tubular, cylindrical; apertures oval; length .25 mm., distant from each other about equal to the length of an aperture; the surface consists of rounded elevations, 4 mm. in diameter; apertures arranged in rows, radiating from the centres of elevations, sometimes indistinct, the radiating rows appearing as ridges; internal intercellular tissue consisting of vesicles.

THALLOSTIGMA, *Hall.*

THALLOSTIGMA VARIAPORA, *n. sp.*

An expansion, with cell tubes at right angles to the surface; cell walls thin, septa infrequent; one-half the thickness of the cell walls, four in 5 mm.; intercellular space composed of septate tubuli; septa closely arranged; cell-apertures circular, irregularly disposed; maculæ elevated, width of base 6 mm., the whole surface composed of these elevations; cells nearest the center large; margins of apertures thin, distinctly elevated; intermediate space with angular pits.

Locality—West Williams, Canada.

THALLOSTIGMA CONFERTIPORA, *n. sp.*

Expansions or masses formed by superimposition of successive growths; cells cylindrical, tubular, and for the greater portion of their length at right angles to the surface, diameter .33 mm., septa infrequent; intercellular tissue composed of minute tubuli divided by numerous septa; cell-apertures circular, closely disposed maculæ; arranged in regular intersecting rows; margins thin, distinctly elevated, spinulose.

Locality—Moscow, N. Y.

THALLOSTIGMA SCROBICULATA, *n. sp.*

Expansions or masses by superimposition; cells tubular, cylindrical; apertures parallel with surface; diameter .24 mm.; walls of cells thin; septa infrequent; intercellular space vesiculose; apertures of tubes irregularly disposed; margins of apertures thick, distinctly elevated, granulose; maculæ at irregular distances, without cell-aper-

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tures, not elevated; intermediate space occupied by angular pits of irregular size, some equal to the cell-apertures.

Locality—Bellona, N. Y.

THALLOSTIGMA SERRULATA, *n. sp.*

Expansions, or masses formed by superimposition of successive layers; cells tubular, cylindrical, at right angles to the surface; walls thick, longitudinally striated; intercellular space vesiculose; apertures circular, diameter .33 mm., quite regularly distant from each other about equal to the diameter of an aperture; the portion of the cell wall extending above the surface strongly striated, the striations extending beyond the summit, and giving to it a serrate appearance; intermediate space occupied by shallow angular apertures, frequently as large or larger than the cell apertures.

Locality—West Bloomfield, N. Y.

THALLOSTIGMA UMBILICATA, *n. sp.*

Expansions, or massive from accretions of growth; cell tubes cylindrical, tubular; apertures circular, parallel to the surface, diameter .33 mm., regularly distant from each other equal to the width of the aperture; margins strongly elevated; intermediate space occupied by pits, which are variable in size; maculæ distant from each other 6 mm., elevated; centers much depressed for the space of 1.50 mm., and destitute of cell-apertures.

Locality—York, N. Y.

THALLOSTIGMA LONGIMACULA, *n. sp.*

Lamellate expansions; cells tubular, round or subangular; cell walls thin, non-septate; intercellular space consisting of vesicles or minute septate tubuli; cell-apertures subtriangular, irregularly disposed, diameter .25 mm.; margins very thin, slightly elevated; intermediate space occupied by angular pits; maculæ elongate, depressed; cells immediately around maculæ larger and more oblique than on other portions of the frond.

Locality—York, N. Y.

THALLOSTIGMA DIGITATA, *n. sp.*

Expansions; frequently presenting a digitate appearance; cell-apertures oval; length .25 mm., width four-fifths the length, quite regularly distant from each other about one-half the width of an aperture;

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margins thin, very slightly elevated; intermediate space occupied by minute angular pits. There are numerous conical nodes or spines situated between adjacent cell-apertures, the base occupying the space between them.

Locality —Hamburg, N. Y.

THALLOSTIGMA DENSA, *n. sp.*

Expansions; cells tubular, apertures oval, circular, polygonal, diameter .25 mm., closely disposed, some portion of adjacent cells usually touching, frequently disposed in comparatively straight lines; intermediate space occupied by angular pits; maculæ from 2 to 3 mm. distant, composed of cells which are usually subpolygonal and larger than others.

Locality—York, N. Y.

THALLOSTIGMA MICROPORA, *n. sp.*

Expansions; greatest thickness observed .33 mm.; apertures nearly circular, diameter .20 mm., irregularly disposed, margins thin, elevated; intermediate space occupied by minute angular pits about 10 in the space of 1 mm.; from one to three series between adjacent apertures.

Locality—Eighteen Mile Creek, Erie county, N. Y.

THALLOSTIGMA SEGREGATA, *n. sp.*

Expansions; cells tubular, cylindrical; apertures broadly oval or circular, diameter .33 mm., margins strong, distinctly elevated, irregularly disposed; intermediate space occupied by minute angular pits, from one to four series between adjacent apertures. This is similar in appearance to T. *micropora*, but the cells are much larger.

Locality—Eighteen Mile Creek, Erie county, N. Y.

THALLOSTIGMA STRIATA, *n. sp.*

Expansions or masses formed by accretions of growth; cells tubular, cylindrical, walls thick, non-septate; apertures broadly oval or circular, diameter .25 mm., sometimes irregularly disposed, at other times quite regularly distant from each other about the diameter of an aperture; intermediate space with angular pits, usually about 10 in the space of 1 mm., but sometimes as large as the cell-apertures; usually so arranged as to give a striated appearance to the surface.

Locality—Hamburg, N. Y

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THALLOSTIGMA DECIPIENS, *n. sp.*

Expansions or masses; cell-apertures polygonal, .33 mm in diameter; when the surface is worn the angularity is slight, sometimes they are circular, irregularly disposed; sometimes in contact, at other times distant twice the diameter of an aperture; margins thin, elevated; intermediate space occupied by angular pits, varying greatly in size. The apertures and pits being polygonal and frequently nearly of the same size, it is very difficult to distinguish them from each other, the surface presenting very much the appearance of that of a Chætetes or Paleschara.

Locality—York, N Y.

THALLOSTIGMA SUBTILIS, *n. sp.*

Foliaceous expansions; cell-apertures oval or subpolygonal, occasionally circular; length .20 mm.; irregularly disposed, distance from each other varying from contact to twice the diameter of an aperture; margins elevated, and on some portions of the frond having a very strong spine; intermediate space occupied by pits, nearly the size of the apertures, with their margins equally elevated.

Locality—Canada West

THALLOSTIGMA PLANA, *n. sp*

Expansions or masses; apertures circular, diameter .40 mm, or some fronds quite regularly distant from each other, slightly less than the diameter of an aperture; in other fronds very irregularly disposed; margins thick, elevated, the apertures being very prominent; intermediate space with shallow angular pits; maculæ from 1 to 2 mm. in diameter, destitute of cell-apertures

Locality—Darien, N Y.

THALLOSTIGMA SPHEROIDEA, *n. sp.*

Consisting of spheroidal masses formed by the accretion of successive layers of growth, cells tubular, cylindrical; septa infrequent; intercellular tissue consisting of irregularly disposed vesicles; cell-apertures subpolygonal or circular, .50 mm. in diameter; margins elevated, some portion of the margins of adjacent apertures usually in contact; frequently the intermediate angular pits occur on all sides of the aperture, but often they occur only at the angles; walls with spinules.

THALLOSTIGMA TRIANGULARIS.

Expansions or masses, cells tubular, cylindrical; apertures arched or triangular, diameter .25 mm., quite regularly arranged, alternating

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and subimbricating, arched or triangular; the upper part of the cell walls are exposed for a distance equal to or more than the diameter of an aperture; intermediate space occupied by minute angular pits, those occupying centers of maculæ larger; at the angles of the pits are prominent granules; maculæ low, rounded, distant 6 mm., arranged in intersecting rows.

Locality—New York

THALLOSTIGMA INCLUSA, *n. sp.*

Cells tubular, cylindrical; for one-half of their length parallel with and resting on the epitheca then turning abruptly and continuing at right angles to the former portion; the intercellular space is composed of septate tubuli, two-thirds the size of the cell tubes, divided by thin, closely arranged septa; cell-apertures circular, diameter .25 mm., quite regularly distant from each other, distance equal to the diameter of an aperture; margins thin, slightly elevated; midway between the cell-apertures are strong ridges which unite and form polygonal elevations around each aperture; the space between the marginal apertures and ridge is flat, and occupied by minute angular pits.

Locality—York, N. Y.

CERAMOPORA, *Hall*

CERAMOPORA (LICHENALIA?) CLYPEIFORMIS, *n. sp.*

Consisting of a circular expansion, upper surface rounded and the lower flat; thickness at center 1 mm.; at center of upper surface is a slight space destitute of cell-apertures; from this space the cells radiate in all directions; apertures very closely arranged, arched or triangular, alternating and imbricating.

Locality—York, N. Y.

CERAMOPORA (LICHENALIA?) IMBRICELLA, *n. sp.*

Cells arising obliquely from the epitheca, gradually enlarging to the apertures, very oblique, sometimes at right angles to the surface, usually triangular, alternating and imbricating; the upper portion of the exposed cell walls has, along the middle, a comparatively strong carina; cell wall sometimes exposed to the extent of 1 mm.

Locality—New York.

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STICTOPORA, *Hall.*

STICTOPORA INCISURATA, *n. sp.*

Flattened dichotomous branches; bifurcations infrequent, sometimes 30 mm. distant, width 4 mm.; greatest thickness .75 mm.; width of non-celluliferous margin .35 mm., the ridges separating the longitudinal ranges of apertures sometimes continuing across this space, and from their extension giving a serrated appearance to the margin; cells tubular, cylindrical, apertures circular or slightly oval, diameter .25 mm., arranged in longitudinal rows, increasing by interstitial addition; margins of apertures very distinct and prominent, some portion of the margin bearing a denticulate projection; ridges, separating longitudinal rows of apertures, of varying appearance.

STICTOPORA OBLIQUA, *n. sp.*

Width of branches 3 mm., non-cellular margin .25 mm., straight, not indented; apertures rounded or slightly oval, diameter .25 mm., arranged in longitudinal rows, which are slightly divergent; margin of lower portion of aperture more prominently elevated; the ranges of apertures separated by a distinct ridge.

STICTOPORA INDENTA, *n. sp.*

Bifurcations occurring at intervals of from 5 to 13 mm.; width of branches 6 mm.; greatest thickness slightly more than .50 mm.; non-celluliferous portion of the margin entirely wanting or very narrow; cell apertures circular or slightly oval; diameter .25 mm., arranged in longitudinal rows from 11 to 17 rows on a branch; 10 apertures in the space of 5 mm., longitudinally; margins distinctly and usually equally elevated; sometimes there is a denticulate projection from the lower or lateral portion of the margin.

Locality—Lodi Landing, Seneca Lake, N. Y.

STICTOPORA PALMIPES, *n. sp.*

Greatest thickness of the bryozoum .50 mm.; celluliferous portion of the branch varying from 1 to 1.50 mm. in width. The mode of branching differs from that of the usual forms of Stictopora. The branches are primary and secondary; the secondary branches are short, not exceeding 1.50 mm. in length; the primary branches are distant from each other about 3 mm.; the secondary branches 2 mm., or less; width of non-celluliferous margin .80 mm.; it continues around the end of the secondary branch, and from that point to the secondary branch above, entirely limiting the celluliferous portions of

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the branch. The celluliferous portion has thus somewhat the appearance of encrusting a smooth surface; cells tubular; apertures circular, diameter .22 mm., arranged in longitudinal rows, sixteen or seventeen in the space of 5 mm., the longitudinal rows are separated by a strong ridge, having numerous strong nodes or short spines.

Locality—Hamburg, N. Y.

STICTOPORA SINUOSA, *n. sp*

Branches diverging at an angle of 45 degrees; width 2 mm., greatest thickness 1 mm.; cell-aperatures broadly oval, nearly circular, oblique to the surface, margins thin; diameter of aperture .25 mm.; apertures arranged in irregular longitudinal rows and sometimes in oblique ascending rows, from 7 to 10 longitudinal rows in the width of the branch, separated by a narrow sinuous, sometimes interrupted ridge.

Locality—Near Auburn, N. Y.

STICTOPORA MULTIPORA, *n. sp.*

Some of the fronds present a somewhat rigid appearance; width of branches 2 mm.; greatest thickness .55 mm.; margins of branches acute; cell apertures circular, diameter .17 mm., arranged in longitudinal rows, separated by a narrow ridge; margins of branches notched or serrated by prolongation of striations.

Locality—Borodino, N. Y.

STICTOPORA SUBRIGIDA, *n. sp.*

Branches diverging at an angle of 80 degrees; width 2 mm.; greatest thickness .75 mm.; apertures circular, usually parallel with the surface, .25 mm. in diameter, arranged in longitudinal parallel rows, five or six rows on a branch, those nearest the margins opening very obliquely; non-celluliferous margin .50 mm. in width; space between longitudinal rows flat.

Locality—Middleburg, N. Y.

STICTOPORA INCRASSATA, *n. sp.*

Branches diverging at about 40 degrees; width of branches 3 mm.; greatest thickness from 2 to 3 mm.; margins of cell-apertures parallel with surface, opening directly outward; apertures oval, length two-fifths of 1 mm., arranged in longitudinal rows, usually seven rows on a branch; margins thin, but distinctly elevated and with minute spinules; in each aperture there is a distinct spine, proceeding apparently from the side of the interior.

Locality—New York.

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STICTOPORA GRANIFERA, *n. sp*

Width of branches from 2.50 to 5 mm.; greatest thickness 50 mm.; cell apertures oval, nearly parallel with the surface; length .30 mm., irregularly and very closely disposed, frequently forming an irregular transverse row; the elevated margins of the apertures, forming the rows coalescent; margins strong, with from three to five nodes on the summit; space between apertures striated; striæ interrupted, having numerous nodes; non-celluliferous margin narrow, striated, striæ granulose; the branches, so far as observed for a short distance above a bifurcation contract, then expand quite abruptly.

Locality—Pavilion, N. Y.

STICTOPORA INTERSTRIATA, *n. sp.*

Width of branches usually from 2.50 to 3 mm., much widened immediately below the bifurcation; greatest thickness .65 mm.; apertures oval, parallel with the surface; length .33 mm., usually disposed in irregular transverse rows; margins, strong, elevated, and having from their sides several minute denticulations extending toward the center of the aperture; intermediate space having minute interrupted striations.

Locality—New York.

STICTOPORA PERMARGINATA, *n. sp.*

Width of branches 1.25 mm.; greatest thickness .33 mm., apertures oval, length .40 mm., margins very strongly elevated, generally closely disposed; some portion of the margins of adjacent apertures in contact; between adjacent apertures sometimes a single carina; margins and carina with minute nodes or granules.

Locality—Hamburg, N Y

STICTOPORA? SCUTULATA, *n. sp.*

Only fragments of this species have been observed, from which it is impossible to determine whether ramose or not. Width of branch 2 mm., greatest thickness .55 mm., apertures polygonal, coalescent, length .25 mm., frequently arranged in oblique ascending rows; margins thick, granulose, and frequently at the angles a short spinule.

Locality—Lodi Landing, Seneca Lake, N. Y.

STICTOPORA? SUBCARINATA, *n. sp.*

Width of branch from 2 to 2.50 mm.; greatest thickness 15 mm.; apertures circular or oval, sometimes parallel with, at other times oblique to, the surface; arranged in parallel longitudinal rows, usually

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separated by striations, the one separating the central rows somewhat larger than the others, and giving to portions of the branch a subcarinated appearance; occasionally only this ridge is present; non-celluliferous space at margin .33 mm. in width, flattened, smooth or granulose; margins sometimes crenulated.

Locality—Bellona and York, N Y

GENUS TÆNIOPORA, *Nich.*

Frond growing as a flattened stipe, from which proceed opposite or alternating lateral branches: along the middle of each branch is a sharp elevated carina, frond celluliferous on each face, cells arising from a mesial epitheca; apertures arranged in longitudinal parallel rows, sometimes in oblique ascending rows.

TÆNIOPORA EXIGUA.

Tæniopora exigua Nicholson. Palæontology of Ontario, p. 108, 1874.

Lateral branches diverging at an angle of 80 degrees, width 3.50 mm.; thickness of transverse section .75 mm., height of carina .75 mm.; cells tubular, for the greater portion of their length parallel with the epitheca, opening directly outward; cell-apertures circular; non-celluliferous space at the margin 50 mm. in width; the rows of cells at middle of branch smallest; each succeeding row larger; the number of rows differ from 2 to 5, but all intermediate forms occur.

Locality—Bellona, and numerous other localities, New York and Canada

GENUS PTEROPORA, *nov. gen*

Frond consisting of a main axis with numerous branches; axis triangular; sides equal concave; cells arising from internal plates which radiate from the center to each angle; apertures arranged in longitudinal rows; margin at angles destitute of apertures. From each angular margin proceed branches, diverging at an angle of 40 degrees, simple or branching; transverse section lenticular, along the middle of each side are sharp, strong carinations; branches celluliferous on each face; cells arranged in longitudinal rows.

PTEROPORA DUOGENERIS, *n. sp.*

Axis triangular, width of each face 6 mm., equally concave. The lateral branches are like those of Tæniopora, from which it may be distinguished by the central axis.

Locality—In a loose mass at Unadilla Forks, N. Y.

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GENUS PRISMOPORA, *nov. gen.*

Bryozoum, consisting of triangular branches, frequently forming irregular masses, sides equal or unequal, subangularly concave, celluliferous on each face: cells arising from internal plates which radiate from the center to each angle; angular margins non-celluliferous.

PRISMOPORA DILATA, *n. sp.*

Branches frequent, sometimes rapidly widening and becoming flabellate; sides equal or unequal; width of sides from 4 to 7 mm., interior intercellular space vesiculose; cells opening directly outward, or slightly oblique to the surface, apertures irregularly disposed, diameter .33 mm.; width of non-celluliferous margins .33 mm.

Locality—Near Leonardsville, N. Y

GENUS SEMIOPORA, *nov. gen.*

Bryozoum flat, branches infrequent, sometimes bifurcating, at other times, trifurcating; margins essentially parallel; celluliferous on both sides; cells arising from a mesial epitheca; apertures circular or oval, arranged in longitudinal parallel rows, ranges separated by a distinct continuous ridge; and between the cells in a longitudinal direction, are two minute pits; apertures nearest to the margin larger and more oblique than the others; a marginal space non-celluliferous, striated.

SEMIOPORA BISTIGMATA, *n. sp.*

Width of branches 2.50 mm.; greatest thickness .60 mm., apertures broadly oval, nearly parallel with the surface; length of aperture .33 mm., arranged in parallel longitudinal rows, eight rows in the width of a branch, separated by a narrow angular ridge; non-celluliferous marginal space very narrow, striated.

Locality—New York.

GENUS ACROGENIA, *nov. gen*

Frond ramose, proliferous, two branches proceeding from the truncate termination of the previous one; base of each division conical, terete above, strongly striated, becoming flattened and celluliferous; transverse section of the completed branch lenticular, celluliferous on each side; a space at the margin non-celluliferous; cells arranged in longitudinal rows, separated by ridges, apertures of middle of branch smallest, those of each succeeding row becoming larger.

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ACROGENIA PROLIFERA, *n. sp.*

Width of branch 2 to 3 mm.; greatest thickness .15 mm.; cell-apertures parallel or oblique to the base, circular or oval, diameter varying from .20 to .50 mm; when oblique to the surface, the lower portion of the margin is most elevated, the apertures appearing as a succession of loops; the rows are separated by continuous ridges, the central ridge much stronger than the others.

Locality—Bellona, N. Y.

GENUS HEDERELLA, *nov. gen.*

Bryozoum consisting of a filiform axis with opposite or alternate lateral budding of simple tubular cells, or of lateral extensions having the same mode of growth as the original.

HEDERELLA CIRRHOSA, *n. sp.*

A filiform tube, from which proceed laterally simple tubular cells, and at irregular distances tubular extensions, whose manner of growth is the same as that of the main tube; parasitic, procumbent, attached for their entire length; diameter .20 mm.; the lateral cells generally alternate and are distant from each other on the same side of the branch 2.50 mm.; before ceasing growth they turn abruptly outward; tubes transversely annulated.

Locality—York, N. Y

HEDERELLA CANADENSIS, *Nich. sp*

Aulopora canadensis. Nich. Pal. Prov. of Ontario, 1874. *Alecto canadensis.* Nich Canadian Naturalist. Vol. 7, No. 3.

Lateral tubes have a length of 1.50 mm.; they are quite regularly arranged, and are distant from each other on the same side of the branch 1.50 mm.; cell for the greater portion of its length of the same size., diameter .50 mm, surface marked by strong transverse annulations and fine striæ.

Locality—York, N. Y.

HEDERELLA FILIFORMIS.

Aulopora filiformis, Billings, *Canadian Journal*, New Series, Vol. 4, p 119

This species differs from all others of the genus in the compact arrangement of the cells. It may be very easily distinguished from *H. cirrhosa* by its large size; from *H. canadensis* by its larger size, and from the fact that the lateral cells are parallel to and in contact with the main axis for their entire length: from *H. magna* from its much smaller size.

Locality—York, N Y.

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HEDERELLA MAGNA, *n. sp.*

The lateral tubes are frequently regularly arranged, but often otherwise, diameter 1.25 mm.; length 2 mm.; near the end the cell turns upward, and the circular and slightly expanded aperture is parallel with the axis of the branch. The surface is marked by fine transverse striæ, and frequently by strong annulations. This species can easily be distinguished from all other forms by its much larger size.

Locality—York, N. Y.

PTILIONELLA, *nov. gen.*

Bryozoum parasitic, procumbent, attached along its entire length; ramose; branches at irregular intervals; cells tubular, subcylindrical; the attached portion flat, the free portion round; cells on each side of the rachis contiguous, but not coalescing.

PTILIONELLA CONFERTA, *n. sp.*

Width of cell at base .25 mm., increasing to .50 mm.; cells in contact nearly their entire length; transverse section oval; aperture slightly elevated, circular, opening directly outward; surface with annulations, and with fine distinct longitudinal striations.

Locality—Darien, N. Y.

PTILIONELLA PENNIFORMIS, *n. sp.*

Width of cells at base .25 mm., increasing to .66 mm.; cells on each side of rachis contiguous, but not coalescing; the end of each cell-tube projecting beyond the previous cell gives a serrate appearance to the frond, tubes strongly annulated; apparently angular. Where the annulations have the appearance of nodes the tubes are not angular.

Locality—Cazenovia, N. Y.

PTILIONELLA NODATA, *n. sp.*

Diameter of cell-tubes at base .25 mm., enlarging to .75 mm.; in contact with each other nearly their entire length, and frequently coalescing; each succeeding cell projects beyond the preceding about .80 mm.; length of cell-tube nearly 4 mm.; tubes very strongly annulated or nodose; sometimes the annulations extend across the cell-tube, but usually there is a strong line of nodes on each side, sometimes coalescing with similar nodes on adjoining tubes, the apertures

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are oval or lunate, and directed upward; the tubes are generally slightly overlapping; the nodes on different tubes are very variable.

Locality—New York.

HERNODIA, *nov. gen.*

HERNODIA HUMIFUSA, *n. sp.*

Epizoic, procumbent, consisting of tubular cells enlarging to near the aperture; diameter at smaller end .33 mm.; greatest diameter 1 mm.; aperture slightly contracted; length of tube 5 mm.; surface marked by comparatively strong annulations, concentric striæ and faint longitudinal striæ. Growing upon *Gomphoceras*.

Locality—New York.

PTYLOPORA, *McCoy.*

Bryozoum attached by radices, from which arises a strong midrib, having slender equi-distant, cylindrical, lateral branches, connected by dissepiments; midrib gradually growing smaller from the base; celluliferous on one side.

PTYLOPORA STRIATA, *n. sp.*

Width of rachis from 1 to 1.25 mm.; non-celluliferous side rounded, striated; from ten to twelve striæ on a branch, diameter of lateral branches .20 mm.; situated at regular distances apart; non-celluliferous side striated, dissepiments depressed, oblique; on celluliferous side the cell-apertures are arranged in two rows, opening directly laterally, fourteen in the space of 5 mm.; margins thin, elevated.

Locality—West Williams, Canada.

PTYLOPORA NODOSA, *n. sp.*

A transverse section of the midrib circular; width on fragments observed .33 mm.; width of lateral branches .20 mm.; space between adjacent branches .40 mm.; cell-apertures slightly oval, .20 mm. in length, arranged in two rows, usually opening laterally, margin of apertures thin, elevated; space between ranges elevated, striated, nodose.

Locality—Alden, N. Y.

GLAUCONOME, *Goldf.*

GLAUCONOME CARINATA, *n. sp.*

Width of midrib .40 mm.; of lateral branches .20 mm.; lateral branches diverging at an angle of 90 degrees; non-celluliferous side of the midrib flattened, with a comparatively strong carina along the

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middle; the margins of the branch are sharp and elevated, having the appearance of two striations. The midrib has thus the appearance of having three ridges, the central one the strongest; lateral branches similar; on celluliferous side the branches are subangular; cell-apertures minute, circular, with comparatively strong, elevated margins; ranges of apertures separated by comparatively strong, sharp carina.

Locality—Eighteen Mile creek, Erie county, N Y.

THAMNISCUS, *King.*

THAMNISCUS PAUCIRAMUS, *n. sp*

Bifurcations distant from each other from 3 to 7 mm.; branches diverging at an angle of from 30 to 40 degrees, enlarging below bifurcation; width from .50 to 1 mm.; non-celluliferous side striated, granulose; cells opening obliquely, apertures small, circular, or polygonal from mutual pressure; diameter .20 mm., closely but irregularly disposed; usually in contact.

Locality—Monteith's Point, Canandaigua Lake, N. Y.

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THE FIRST MEN:

THEIR EPOCH, HABITAT AND CRANIA.

By Stephen C. Hutchins.

[Read before the Albany Institute, February 15, 1881.]

The subject which I propose for consideration this evening is one which is attracting general attention, and the solution of which is engaging the critical examination of the most eminent scientific investigators. My purpose is to gather together the sum of present knowledge concerning the first men, free from detail, and to connect it with certain hypotheses; the whole forming what it seems to me is the provisional answer men are preparing to give to questions concerning the epoch, habitat and crania of their original ancestors. I trust I shall not be deemed presumptuous in presenting for your consideration so intricate and involved a problem, for I shall assume that when scientific men have thoroughly explored the accessible sources of knowledge, the results of their investigations are to be accepted as the best attainable truth, if not as actually the truth itself. At the same time I shall feel at liberty to disregard conjecture, or even hypothesis, and to supply suppositions of my own, in cases where it seems necessary to do so, in order to preserve the continuity of the provisional history which I shall briefly outline, subject to verification.

Among the sources of our knowledge we ascribe high authority to the book of Genesis. While we do this, however, we must at the same time carefully distinguish between the book itself and its interpretations. It is within the memory of most of us that it was regarded as heresy to deny that the earth was created in six days of twenty-four hours each. Now, this construction of the ancient record has been cast aside, and there has been no better use found for the vast number of printed volumes enforcing it than to grind them into pulp again, perchance to afford the white pages upon which to print a history of creation far more in harmony with the character of the great Author whose press has been the forces of the universe, the leaves of whose work have been the stratified rocks of the earth, and whose types have been the fossilized remains of flora and fauna, ranging from the tiniest, most simple and most delicate to the largest, most complex and most ponderous. As we have cast into heaps of literary rubbish the interpretations which men were once arrogant enough to claim as the only literal and authorized version of a revealed account of creation, so one must discard the crude constructions of the antediluvian portion of the narrative, and

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adopt one which, while being even more in harmony with the Word, shall conform to the history of man which God Himself has written in the open pages of the fossilized races now to be found the world over, arranged in the strata where they were originally deposited, when man was being gradually developed into the stature we now find him.

It is established that the cyclical succession in the earth's history is correctly recorded in Genesis. We must give to the "days" therein described, however, a more specific character, if we would ascertain their full significance. The "evening" and the "morning" have definite meaning, and we must determine what that meaning is, or else lose the full force of the testimony of the Word. A natural day is a completed cycle, and so must the days in Genesis have been, or the original term (*yom*) has been employed without due regard to its pertinence and value. These cycles must have conformed in general character to the natural day, or else the terms "evening" and "morning" have been used carelessly and at random. We must, then, base our divisions of the world's history into ages upon the divisions in Genesis, and depart from scientific nomenclature sufficiently to enable us to give names to those days, derived from their characteristics as stated in the Word, if we would synchronize the two accounts, and ascertain the night and noon of each day. If science will enable us to do this, we shall find in Genesis the cycle in which the first men were created. If the result thus reached shall be in harmony with advanced science, let us not shrink from accepting it as the true solution; for man is older than he is willing to own, as well as woman, and there can be no real conflict between the record of God in the rocks of the earth or the races of men, and the revelation of His doings which He gave to the founders of His true worship.

The Hebrew day began with the "evening," and thus began each creative cycle.* In undertaking to give precise definition to the terms "evening" (*erev*) and "morning" (*voquer*), we shall be greatly assisted by the fact that in Hebrew the same consonants, as a rule, embody the same root idea, and that the different meanings are expressed by the vowels. *Erev*, therefore, is related in thought to *arev*, which means to mix, conceal, confuse together; and *voquer* is connected with *biquar*,† to make appear, develop. In each creative day, therefore, there was developed or made to appear during the morning that which was mixed, concealed or confused together during the evening; and hence each day was a distinct cyle of evolution.

* The author has rewritten the paragraphs in which the "days" of Genesis were considered, in order to avail himself of the interpretations of *erev* and *voquer*, *thehom* and *hoshak* given in an able work entitled "Conversations on the Creation: Chapters on Genesis and Evolution," published by the Sunday School Union, London.

† The consonants "b" and "v" are more or less interchangeable in nearly all languages.

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It is distinctly declared in Genesis that the evening of the first day was marked by just such concealment or confusion. The earth was formless and void. Darkness was upon the face of the deep, or *thehom*, a word closely related to *thohu*, or confusion; as *hoshek*, the original Hebrew for darkness, is related to *hasak*, which denotes absence of action, or refraining. This deep is termed *mayim*, a word which usually means waters, but which is also a general term for the fluids of the universe. When the Spirit of God moved upon this chaotic mass, motion was produced, and light followed, precisely as the nebular hypothesis explains. This was the first day.

There followed another period of confusion, when all the elements of the earth were mixed together, at high temperature; but from this confusion there finally came an orb covered with water over its entire surface, which water was separated from the waters above by an expanse. The morning of this day did not end until the chaos of the stormy evening had been superseded by order; and, as the appearance of water was followed by the appearance of life, this second day may properly be termed the Ezoic cycle. At some time during this day, from the not-life of the preceding Azoic cycle, there came the first marine creatures of our planet.

Another period of confusion followed. Land appeared above the surface of the waters, but it was at first barren and shapeless. Concealed in this new-made soil, however, were the germs of vegetation, which the land was to bring forth. The reference is to the original Palæozoic vegetation — the vegetation alluded to in the second chapter being of a different character, the plants of the field, that is, domestic grains. This, then, was that great Phytozoic cycle, which had its culmination in the carboniferous vegetation.

Now comes the fourth period of confusion — the burial of this vegetation in great coal vaults. With all the mixed and confused terrestrial phenomena which must have occurred up to this time, there were no seasons, as we now know them, as the uniformity of life in every section of the globe attests. Order was restored; the land, after various upheavals and subsidences, became quiet; life was no longer uniform in every section of the globe; the pulpy trees of the carboniferous period were succeeded by the fibrous and woody vegetation of the Permian period, and, with the appearance of winter, the fishes of the old time, which had been fitted for the warmer waters of their day, were superseded by others, adapted to cooler waters. Thus is the proof afforded that on this, the fourth day, the sun, moon and stars were completed, and took their places as ruling orbs.

The confusion which followed the Permian period was so great, the break so extensive, that geologists are yet unable to tell us what took

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place. The rocks of the Permian period are said by some authorities to give evidence of glacial action; and the rocks of the fifth day, or Mesozoic cycle, show that it was an age in which minor creatures and reptiles which spawn rapidly, large fowls and great aquatic monsters abounded, as Genesis declares, so that it is not necessary to dwell here to establish that which is the object of inquiry — the identification of the sixth day.

The sixth great period of confusion was the beginning of the Kainozoic cycle; the sixth great period of development was the evolution of the Mammalian kingdom, closing with the creation of man, an act which justifies its classification as the Phrenozoic cycle. It must be borne in mind, also, that there was a seventh day; and hence that there must have been a seventh period of confusion, a seventh evening, a seventh period of development, a seventh cycle, during which that which was concealed in the "evening" was made to appear in the morning. Man must have been created before the evening of the seventh day, for he was created during the sixth day, after the creation of the lower orders of mammals, but before the close of the cycle. This day must have terminated with the first evening, or period corresponding thereto, following the creation of the animal kingdom, in general. Man was created before the close of the day, or cycle, if the author of Genesis knew whereof he affirmed. Hence, to place his creation after two glacial epochs, or even after one, is to do violence to the narrative. Man, therefore, must have been created before the glacial period, which was the evening of the seventh day.

The existence of man during the inter-glacial or Reindeer period is fully established. The memory of the last glacial period, we assume, is preserved in the Persian tradition of a great climatic change, synchronizing with the departure of their ancestors from their original home; and is typified in Genesis by the symbol of the Lord God clothing man with skins. The inter-glacial period, then, was the seventh day, or Psychozoic cycle; the Sabbath of the creative cycles which the Lord God blessed and sanctified. The condition and migrations of man during the inter-glacial or Reindeer period prove that he had been created and developed somewhere at the east, and can only be satisfactorily explained by assuming that this creation occurred before the glacial period which immediately preceded the Reindeer period; for, as he followed the retreating glaciers into Europe, he must have been created before their formation, in order to have matured and multiplied and acquired a migratory disposition.

The weight of this argument for the pre-glacial origin of man rests upon the interpretation of the terms "evening" and "morning" as indicating a complete cycle, and the assertion of Genesis that man was created on the same day with other mammals.

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The conservative scientific argument against this view is, that the traces of pre-glacial man are too meager and doubtful to be accepted as conclusive. This, however, is just what we should expect in the beginning of the race; and cannot be permitted to nullify such proofs as may actually exist.

The traditional Scriptural argument against this position is, that it is in irreconcilable conflict with Biblical chronology. The answer to that is, that there is no Biblical chronology; only uninspired and conflicting schemes computed from the Scriptural record, but having no binding authority. Indeed, there is no settled chronology, fixing either the glacial epochs or the beginning of the human race. So far as either scientific or Scriptural authority goes, we are at liberty to accept any dates we please.

We would not place undue stress upon the Scriptural argument we have advanced in favor of the pre-glacial origin of man. We think, however, we can properly claim that it affords presumptive proof of such origin, and gives weight to the probability that traces thereof exist. We add to these evidences an argument derived from the unity in diversity of the human race.

Adam, says Lange, means "the red one, from the red earth taken." This is confirmed by the monuments of Egypt, upon which the ancient Egyptians were represented as of brick-red color. They were really a brown race, however. The first men, therefore, were neither white nor black, but of some intermediate shade. The white races, no one will dispute, were a later development. Again, the blackest races are not the lowest in organism, and hence they do not represent the first men, and are likewise to be eliminated. The brownish-yellow inhabitants of eastern and north-eastern Asia are likewise of later origin, and are to be omitted from consideration. This leaves only the brown races to be considered.

The children of Australians, who are generally classed as lowest among men, are yellowish brown immediately after birth, and become dark at a later age. The Hottentots are regarded by many ethnologists as the lowest of mankind, because of their associations, their repulsive physical characteristics, and their intellectual inferiority. They are of a yellowish brown complexion. The new-born negro child is reddish nut brown, which soon becomes slaty grey; the black color being fully developed within a year in the Soudan, but not until three years in Egypt. The eyes of the negro are at first blue, and the hair chestnut brown, rather than black, being curled at the ends.* Among the Eskimo, the oldest families are brown.

These facts show that the first men were of a uniform brown or

* Pruner Bey.

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reddish-brown color. They must have originated and multiplied, therefore, in an age of uniform conditions, and then encountered various natural influences, differentiating them into existing types. The glacial periods alone supply these influences. When Europe was much colder than it is now, Africa was much warmer — we may say hotter. The black pigment is a natural protector against heat. Nature provides nothing not necessary. This pigment, then, was provided under extra-torrid conditions, to protect men who would otherwise suffer from intense heat.

It will be said, in answer to this view, that Genesis records the existence of but one man and one woman, from the creation of the Adamite until after the expulsion from the garden. This is a mistake. The word used in recording the creation of man is a common noun and not a proper noun. The proper noun is not used until the midst of the scene in the garden, long after the creation of the first men. This scene is a pictorial representation of an historic event of momentous importance; the exact meaning of which it is not our purpose now to inquire. We may say, however, to avoid misunderstanding, that we should give to it an interpretation in no way impairing the most rigid orthodox faith, and in no way conflicting with scientific investigations into the origin of man. In support of our view that the record we are considering covers a very long period, we hold that it is sustained by the established fact that the first chapter of Genesis gives the history of thousands of years, in the most compressed form. It is not probable that the style of the writer suddenly changed toward the close of that chapter, and that he then began to give us an elaborate account of the events occurring in a single year in the life-time of a single pair. From the creation of man to his expulsion from the garden a long time elapsed — how long it is not our purpose to inquire, even if it were possible approximately to estimate it. We must bear in mind that the record is simply a *toledoth*, giving the generations or Genesis of the Hebrew race, and stating only the points of divergence from the main stock, of other races. If we would correctly read the record, therefore, we must consider it as a genealogical tree, and not as a complete history.

We shall now endeavor to show that the division of the human race into two stocks and various vocations is recorded as having taken place on the sixth day; and, in this connection, we shall advance our last argument in support of the pre-glacial origin of man.

Two terms are employed in Genesis, from the creation of man until the deluge, evidently for the purpose of distinguishing between two ancient branches of the human family. These are, respectively, Adam and Ha-Adam. If we discriminate in the employment of these terms,

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and others which are indifferently translated as man and Adam, we may obtain a clue to the earliest divisions of mankind, which with the aid of the science of ethnology will lead to important results. The 26th verse of the 1st chapter reads: "And God said, Let us make Adam in our image, after our likeness, and let them have dominion over the fish of the sea [that is, become fishermen] and over the fowl of the air [hunters] and over the cattle [herdsmen] and over all the earth, and over every creeping thing that creepeth upon the earth" [the smaller domestic animals]. In the fifth chapter, we have the explanation of the plural form when applied to Adam — "male and female created He them, and blessed them, and called their name Adam." In the language of Akkad, *Ad* means "father" and *dam* "mother;" and as Akkad signifies son, descendant or lineage of "Ad," we may not improperly give to the term "Adam" an interpretation expressive of the unity of the race. The record we are considering, in the first chapter, shows the development of the race from fishermen to hunters and herdsmen, and the slow movement of man over the earth, as scientific inquiry has established.

The 27th verse introduces us to another development. The translators have rendered the first word "so," when they ought to have employed the word "and." The verse reads: "And God created Ha-Adam in His own image, in the image of God created he him; male and female created he them." The word "Ha" means "the," and its employment signifies a development, which is simply expressed by designating the differentiated family as "*the* Adam." Its growth is thus recorded: "And God blessed them, and God said unto them, be fruitful, and multiply and replenish the earth, and subdue it [be the ruling race] and have dominion over the fish of the sea [as fishermen] and over the fowl of the air [as hunters] and over every living thing that moveth upon the face of the earth" [the larger domestic animals]. It will be observed that this portion of the sentence is similar to the reference to Adam, except that "cattle" is omitted, and "living things" substituted for "creeping things." With the introduction of domestic animals of a higher order, there came a change which implies that Ha-Adam was something more than a herder of cattle; the fruits and herbs of the field were introduced. "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat; and it was so." The Pliocene was remarkable for its herbivora; and it could not be more accurately described than in this passage.

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When we consider the archaic style of the narrative, therefore, and its analogies, it seems clear that this indicates that man not only existed, but had reached a stage of development at the close of the Pliocene period, contemporaneously with the development of other herbivora.

The work of the sixth day was thus completed. "And God saw every thing that He had made, and behold it was very good. And the evening and the morning were the sixth day."

Le Conte, in his recent work on the Elements of Geology, while admitting that man may be traced to the Pliocene or even to the Miocene epoch, advances an argument against it which is worthy of consideration: "not a single species of mammal now living," he says, "is found in the Tertiary. Shall man, the highest of all, be the only exception? Man is one of the present mammalian fauna, and came in with it. But, again, several distinct mammalian faunæ have appeared and disappeared since the beginning of the Miocene. The Miocene mammalian fauna is totally different from the Eocene; the Pliocene totally different from the Miocene; the Quaternary from the Pliocene, and the present from the Quaternary. It seems in the highest degree improbable that man, a mammal, should survive the appearance and disappearance of several mammalian faunæ. If, therefore, man should ever be traced to the Miocene, it would probably be a different species of man — the genus Homo, but not the species Sapiens."

This argument necessitates the consideration of an opposing one, based upon acknowledged facts, which is similar in its ratiocination, and yet the very antipodes in its result. The flora and fauna of Australia resemble those of Eocene Europe, and in Australia there exist low forms of man which are held by some to be the oldest because the lowest. Did this man come in with the Eocene flora and fauna, the same as modern man came in with modern flora and fauna? Again, the Miocene flora of Europe resembles that of America not only at present but in Eocene times. Did the most ancient man on this continent, then, enter it with the Miocene vegetal and animal life of which he apparently formed a part? Further, the Pliocene flora of Europe resembles that of Southern United States at present. Did man, then, enter this continent, with this vegetation, before he entered Europe? These questions are pertinent, for the reason that we have undoubted traces of Quaternary man. Why not, then, Pliocene and even of Miocene if not of Eocene? The answers to these questions will be given as we proceed, indirectly if not directly.

The comparisons we have cited show that, at some common center, there was a steady progress toward the Pliocene consummation, which resulted in the colonizing of various subdivisions of the earth with

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varying forms of vegetal and animal life. The unity of nature is its highest law, and hence we have no doubt that as the evening of the seventh day drew on, toward the close of the Pliocene epoch, these forms of life were subjected to modification, rendering them more conformable to the wants of man; and that with such modification the development of man took place.

Dawson, who also declines to accept the pre-glacial origin of man, in his Story of the Earth and Man, remarks: "Was the Miocene period on the whole a better age of the world than that in which we live? In some respects it was. Had we lived in the Miocene, we might have sat under our vine and fig-tree equally in Greenland and Spitzbergen and in those more southern climes to which this privilege is now restricted. We might have enjoyed a great variety of rich and nutritive fruits, and, if sufficiently muscular, and able to cope with the gigantic mammals of the period, we might have engaged in either the life of the hunter or that of the agriculturist under advantages which we do not now possess. On the whole, the Miocene presents to us in these respects the perfection of the Neozoic [Kainozoic] time, and its culmination in so far as the nobler forms of brute animals and of plants are concerned. Had men existed in these days, however, they should have been, in order to suit the conditions surrounding them, a race of giants; and they would probably have felt the want of many of those more modern species belonging to the flora and fauna of Europe and Western Asia on which man has so much depended for his civilization."

This certainly foreshadows the domicil of the human race, and we may be sure that the forerunner of man is not far distant, if the unity of nature is to be preserved. There has been found in the Upper Miocene of the south of France an ape equaling man in stature, and apparently living among the trees and feeding upon plants. This ape, termed the Dryopithecus, is considered by M. Lartel, from its dentition, to have approached nearer to man than any other existing species of ape.

We must now consider the habitat of the first men, if we would reach an approximate solution of the problem we are considering. Wallace, in his great work on the Geographical Distribution of Animals, says that "all the chief types of animal life appear to have originated in the great north temperate or northern continents. The process of development has been more rapid in the north, and has resulted in more varied and higher types." This law of nature, we believe, is accepted as incontrovertible; and it seems to us clear that man cannot be an exception thereto. He could not have originated at the south, either on an imaginary Lemurian continent or elsewhere south of the

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Palæarctic region, and migrated northward; he must have been created somewhere on the border of the temperate and tropical regions, and migrated southward.

It is equally a scientific conclusion that man originated in the region of maximum vegetal and animal life; and that there, also, existed the most perfect forerunners of man, in each epoch, from the beginning of mammalian life. It is almost certain, says Wallace (upon whom we here rely for our data) that during the Miocene period Europe was not only far richer than it is now in the higher forms of life, but not improbably richer than any part of the globe now is, not excepting tropical Africa and tropical Asia. "The Mediterranean sub-region," he also says, "is by far the richest portion of the Palæarctic region; and it is perhaps in Asia Minor, on the range of the Taurus, along the shores of the Black sea and to the south of the Caucasus, that this sub-region obtained its maximum luxuriance in vegetation, and in animal life." This is precisely the region known in Genesis as Eden. All the earlier races of men are traceable, from the localities in which they first became certainly known, toward this plateau.

Wallace also shows that there was little difference between the Palæarctic and Oriental provinces previous to the elevation of the Himalayas. The northerly plains of Asia were then probably under water, and a great continental formation extended from north-west to south-east, under generally tropical or sub-tropical influences, gradually modifying in temperature at each extreme. This harmonizes with the fact that man was evidently created in a warm climate.

The elevation of the Himalayas and other mighty ranges worked a radical change in land life. The development and differentiation which took place can now be distinctly traced. From the base to the summit of the Himalayas, all species of flora can be found, from tropical to Arctic forms; while in Eden, on the right bank of the Euphrates, north-west from Arnah, barley, wheat and spelt have been found growing together in a wild state. The changes effected during Pliocene times were wrought gradually. At the close of the Quaternary period, when Ha-Adam was expelled from the garden, he went eastward, to till the ground from whence he was taken. He came from the east, and was driven back. There is thought to be reason to think that man existed on our own continent in Pliocene times, and that he came in with a peculiar fauna from Asia. These reasons lead us to believe that the first men were of Pliocene creation, and that their original habitat was at the point where all life was most rapidly and most perfectly developed. From thence, man was distributed over the face of the earth.

In seeking to trace the first men to some region where we can exam-

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ine their crania and judge their character, we think we shall be sustained in three assumptions. The first of these is, that man followed, if he did not go with, the flora and fauna which were agreeable to him. The second is, that when compelled to go to an inferior region the effect was to degrade him below the standard attained by the first men. The third is, that if he reached a region where he was surrounded by superior influences, he shared in the common development. In other words, primitive man was modified by the same operating causes which affected vegetal and animal life in general.

In view of the fact that we have zoological provinces partaking of characteristics of different periods as far back as Eocene times, we would have no difficulty in obtaining the concession that the original Adamites can be traced in the persons of their descendants, if it were not for two reasons. On the one hand, we are told that there were pre-Adamites; on the other, that all mankind were drowned in the deluge, so that every race now existing descended from Noah. This latter position we believe is untenable, from a scientific standpoint; and we do not believe it is a necessary interpretation of the account in Genesis.

We think it to be an indisputable proposition that anatomically the first men are represented to-day by the men of the lowest cranialogical organization, specimens of which can be found either in the graves of the dead or the lands of the living. As between races competing for this rank, we think it reasonable to hold, as the first men would naturally follow familiar vegetation, that they are more likely to be represented among the earliest races of America than among the earliest races of any other continent. In prosecuting this inquiry, we are manifestly limited to such earliest races.

The Australioid is ethnologically lowest in the scale. Next to him, among African races, is the Hottentot, and the two are closely related. On the other hand, the Malays are most nearly connected. The Australioids have been traced to and identified with the man of the Dekkan, and the ancient Egyptians have been shown by Huxley to be merely a development therefrom. They were a brown race, or Adamites The Australioids and Hottentots have been shown to give evidence of arrested development. Friedrich Muller regards the latter as a racial ruin. We attribute this ruin to the severance of their relation with more progressive stocks, and to their being cast away in a zoölogical province unfavorable to their natural development. While we shall consider them in comparison with other early races, we think it only a fair conclusion that they do not represent the first men, absolutely. The Australians have names for eight different winds, and many of them speak English with fluency. "They are peculiarly inventive in expressions of courtesy, which they both require and bestow freely in

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conversation." They possess very distinct religious conceptions, and their language is, like that of the Koi-Koin [Hottentots], an unexpected evidence of very considerable intellectual power and discrimination. It posseses eight case terminations, and as many numbers as the Greek. "The verb is as rich in tenses as the Latin, and has also terminations for the dual, and three genders for the third person. In addition to active and passive, it has reflective, reciprocal, determinative and continuative forms. We also find among them attempts at poetry, and the names of renowned poets." *

The language of the Hottentots (or Koi-Koin, as they call themselves), says Winchell, "is of great ethnological interest, since, according to Moffat, Lepsius, Pruner Bey, Max Muller, Whitney and Bleek, it presents some resemblances to the language of ancient Egypt. Though other philological authorities dissent from this view, the existence of an opinion of this kind, so well indorsed, proves that the Koi-Koin are in possession of a language which has reached a remarkable development. Whether these people are descendants, with more or less extraneous mixture, from the ancient Egyptians, or have lived in communication with them, or some other civilized people, are questions which naturally arise for discussion. It is not impossible that even so rude a people as the Koi-Koin should have created a language as complex and polished as that which they employ; though it seems more probable that they present to-day the mere ruins of a former better condition, or the reminiscences of ancient contact with a higher race."

Here, then, we have the Adamites in ruins, ethnologically speaking; fallen, theologians would say.

Turning to our own continent, we have the Mound Builders and Cliff Dwellers, who lived north and north-west of the gulf of Mexico; their kindred, the ancient Mexicans and Central Americans, with the ancient Peruvians, who were unlike any other people, except the Mexicans, and were doubtless remotely from the same ancestral stock. The Mound Builders lived so long before the Indians that they were not known to them even by tradition. The carvings upon some of their elaborate stone pipes are thought to prove that they were contemporaries of the Mammoth and the Mastodon. Their civilization is undoubted. In reference to the report of a ceiling in one of the Cliff dwellings which had been arched at the height of twenty-five feet over a room twenty-five or thirty feet in diameter, Dr. E. Bessels remarks: "There are but two tribes inhabiting this continent whose architectural skill proved efficient enough for this purpose — namely, the Peruvians and the Eskimo." † The Eskimo once occupied much of North

* Peschal. † Bulletin of Hayden's Survey, Vol. II, p. 61.

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America, and were driven north and west by the warlike hunting tribes of Indians, who differ profoundly from them and from all earlier races. The Eskimo type also exists among the Patagonians. It is clear that the ancient Peruvians moved southward at a very early date; so early that they lost all recollection of their association at the north, and were not even aware that a contemporaneous civilization existed there. In his work on Peru, Mr. E. George Squier says: "Even if it be assumed that the whole human race sprung from a single family, and that their original seat was in the highlands of Armenia, whence they have overspread the globe, still it remains true that the period of their advent in Peru antedates all human record." The capacity of the Peruvian skull was no greater than that of the Hottentot. The Central Americans say that civilization came to them from the east. They have linguistic affinities to some extent with the Basques of Spain, whose native name ascribes to them an eastern origin. The entire continent of America is overspread with brown tribes, which appear to have been fully developed elsewhere, and then to have immigrated from their original home.*

It is clear that the American continent was at one time in possession of a primeval race whose mental capacity co-existing with craniological inferiority is established. They were likewise morally superior to the Indians, who came after them, notwithstanding the craniological superiority of the latter. Mr. J. S. Phillips explains this by saying: "The intellectual lobe of the brain of these people [the Indians], *if not borne down by such overpowering animal propensities and passions,* would doubtless have been capable of much greater efforts than any with which we are acquainted, and have enabled those barbaric tribes to make some progress in civilization. * * * * *The intellectual and moral qualities of the Mexicans and Peruvians are left more free to act,* not being so subordinate to the propensities and violent passions."

We have now traced man back to the lowest cranial organization which he is known to have possessed, and have found no reason to question the natural capacity of the first men, except the inferences which men draw with regard to skulls containing the minimum of cubic contents. The first men were superior to races which succeeded them the world over. All African races are descended from the Hottentots, and yet they show no improvement. The Malays are the first divarication from the Australians toward the Mongoloid; and yet the further we trace the descent the more brutal are the descendants.

The first men were orthocephalic, or straight skulled; the brain vault being pyramidal or gothic. As to the ratio between length and breadth,

* Tylor.

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the Mound Builders were medium in proportion, while minimum in capacity. While the volume of the brain is small, says Foster, the brain case is as symmetrical as that of the European. In this symmetry, rather than in mere size, we find the cranial index of character. Foster says, further, that the skulls which he has described possess peculiarities which ally them more nearly with the Mongolian than with the negro or European. Short concedes the orthocephalic character of the first races upon this continent, while showing diverging tendencies toward dolichocephalism and brachycephalism. The Australians are excessively dolichocephalic, the Hottentots and Bushmen range from dolichocepnalism to mesocephalism. The negroes are dolichocephalic, except certain mesocephalic tribes in the interior. The Eskimos are dolichocephalic.

The natural development of the cranial structure of the first men was toward brachycephalism; an enlargement of the skull by broadening it. A symmetrical enlargement would be toward the mesocephalic type, after which the extreme of brachycephalism, without corresponding increase of intellectual and moral faculties, would be reached, indicating brutality, and not an improved man. Development does not always mean improvement. It may mean the development of the baser faculties, as well as the intellectual or moral.

The pre-historic tribes of Europe range from dolichocephalism to brachycephalism. The Neanderthal skull is quite like the skull of the Mound Builders. The Engis skull, however, is the most important one for our consideration. Sir John Lubbock says it might have been that of a modern European, so far at least as form is concerned. Prof. Huxley says, "there is no mark of degradation about any part of its structure. It is in fact a fair, average human skull, which might have belonged to a philosopher or might have contained the thoughtless brain of a savage." Of this skull, again says Lubbock, "there seems no reason to doubt that it really belonged to a man who was contemporaneous with the mammoth, the cave bear and other extinct mammalia." Thus we have registered evidence of a man with "a perfectly well-developed skull" living in Europe in the inter-glacial period, or Psychozoic cycle.

In the second chapter of Genesis (v. 23) after the pictorial representation of the Lord God causing a deep sleep to fall upon Ha-Adam, and taking one of his ribs from him (the meaning of which picture we need not here stop to inquire), Ha-Adam names his wife Ishah because she was taken out of Ish. The significance of these terms is lost in their translations, "woman" and "man." Ish means "excellent," and a similar root is so widespread that it must have greater significance than has been given it. The term "Aryan" means excellent

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householder; and while we are not prepared to say that the word Ish is identical therewith, we think we cannot be mistaken in the conclusion that its employment indicates an important advance toward that specific type of man. The designations Ish and Ishah are used in a scene which occurred during the inter-glacial period, if our division of days or periods is correct. If we are not mistaken, therefore, we have here recorded the development of man of the Engis type, as being the specific characteristic of the seventh day. To follow the question further would be to lead us far beyond the limits of our inquiry. We refer to it here merely to add another link to the chain of argument, part of the merits of which, if it has any, is to be found in its synchronous arrangement of the facts of science and history, such as we have just attempted, and the affording of a key to some of the perplexing problems of tradition.

From the Mound Builders to the man of Engis, in time of development, was a long distance. If the first men upon this continent came originally from Asia, a long period must have elapsed before the migration was consummated; and that the first men upon this continent did come from Asia is clear, for the reason that there are no traces in America of any mammal lower than man from which the genus homo could have been developed. If God made man out of a lower order, He must have done so on the eastern continent.

We turn from the inviting field open before us, relative to the development of man, in order to inquire of the first men in America the traditions current among them as to the origin of man. The oldest traditions in connection therewith are found in Central America. Whatever force or vitality we may give these traditions, we cannot escape the significance of the fact that in the Nehuatel (or Toltecan) language the radical *a, atl,* has the various meanings of water, man, and the top of the head. From this comes a series of words, such as *atlan,* on the border of, or amid the water, and others. The root At or Ad is found among primeval peoples everywhere, and everywhere means the first man or ruler.

Traditions of the origin of man, as they are found among ancient races, are generally figurative, or overgrown with crude conceptions, or surrounded by mythical accretions. The traditions prevailing among the Atlans, if we may so term them, are no exception. They have been embodied in the Popel Vuh, a work which, whatever may be said about it, undoubtedly contains the ideas prevailing among these ancient peoples as to the origin of man. Divested of their accretions, these traditions are quite in harmony with the account of creation given in the creation series of Chaldean tablets, when relieved of their mythological conceptions. We shall interpret these traditions in

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harmony with the teachings of science, in order to show how fully they coincide therewith.

"There was not yet a single man; not an animal; neither birds, nor fishes, nor crabs, nor wood, nor stone, nor ravine, nor herbs, nor forests — only the sky existed. The face of the land was not seen; there was only the silent sea and the sky. There was not yet a body; naught to attach itself to another; naught that balanced itself; naught that made a sound in the sky. There was nothing that stood upright; naught there was but the peaceful sea — the sea silent and solitary in its limits, for there was nothing that was." This will answer very well as a picture of the Eocene waters, as they stretched from India to England, when the *foraminifera* were engaged in laying the foundations of the earth in nummulitic limestone.

The record continues: "Those who fecundate, those who give being, are upon the waters, like a growing light. * * * While they consulted, the day broke, and at the moment of dawn man appeared. * * * They then consulted while the earth grew. Thus, verily, took place the creation, as the earth came into being. 'Earth,' said they, and the earth existed. Like a fog, like a cloud [the mist of Genesis] was its formation; as huge fishes rise in the water so rose the mountains; and in a moment the high mountains existed." Can we desire a more vivid description of the elevation of the mighty ranges which skirted what was called the earth in ancient times,— the Himalayas, the Kuen-Lun, the Caucasus, and other mountains — which were raised toward the close of the Eocene age, and during the Miocene?

"Hear, now, when it was first thought of man, and of what man should be formed. At that time spake He who gives life and He who gives form, the Maker and the Moulder, named Tapen Gucumatz. The day draws near; the work is done; the supporter, the servant, is ennobled; he is the son of light, the child of whiteness; man is honored; the race of man is on the earth; so they spoke. * * * Immediately they began to speak of making our first mother and our father. Only of yellow corn and of white corn were their flesh, and the substance of the arms and legs of man. They were called simply beings, formed and fashioned; they had neither mother nor father; we call them simply men. Woman did not bring them forth, nor were they born of the Builder and Moulder, of Him who fecundates and Him who gives being. But it was a miracle, an enchantment worked by the Maker and Moulder, by Him who fecundates and Him who gives being. Thought was in them; they saw; they looked around; their vision took in all things; they perceived the world; they cast their eyes from the sky to the earth. Then they were asked by the Builder

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and Moulder, what think ye of your being? See ye not? Understand ye not? Your language, your limbs, are they not good? Look around beneath the heavens; see ye not the mountains and the plains? Then they looked, and saw all there was beneath the heavens. And they gave thanks to the Maker and Moulder, saying: 'Truly, twice and three times, thanks! We have being; we have been given a mouth, a face; we speak, we understand, we think, we feel, and we know that which is far and that which is near. All great things and small on the earth and in the sky do we see. Thanks to thee, O Maker, O Moulder, that we have been created, that we have our being. O our Grandmother, O our Grandfather!'"

Philosophers have sought to give exact definition to man. What is it which distinguishes him from the rest of the animal kingdom? We doubt if they can get any nearer to it than in this description of his attributes and his aspirations, of the circumstances attending his creation, and his song of praise. Man is primarily a perceptive being — a being which sees the actual, alike in the physical and psychical realms. The perceptive faculties are associated with the forehead; and man existed the moment that the power to perceive the ideal in connection with the power to survey the heavens and the earth with accurate vision was given him. In other words, the frontal development of the skull, to the moderate extent shown by the crania of the first men, constituted the final work in their creation.

The first men are described, in the record we have quoted, physically, intellectually, morally, spiritually. They are seen in this record, and wherever we find trace of them, to have been created in the image of God; and this symmetrical man was not only the actual, but he was the only possible product of the equable climate in which a being with his physical characteristics could alone have originated.

We have seen that man was created on the sixth day, and began to move slowly over the earth. The skulls of the first men were gothic or pyramidal in form; and hence, by their very constitution, these first men were "upright" in character. The inhabitants of Eden, on the seventh day, as they are presented to our consideration in the second chapter of Genesis, and appear to us from the most thorough researches into the ancient past, were simple, pure and intelligent beings; but man, since that day, has indeed "sought out many inventions." The history of the life of Ha-Adam while in Eden is given in Genesis, and its true interpretation would solve some vexed questions, for the day he spent there was an epoch, and not merely a fixed period in the life of a single individual. Into that history, however, we cannot now enter.

According to M. de Serres, the brain of the Caucasian, during em-

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bryonic development, presents in succession the conformations seen in the Negro, the Malay, the American Indian, and the Caucasian. "This statement," says Winchell, "rests on excellent authority, but I am not aware that it has been confirmed. Its significance is apparent, in view of the established principle in physiology, that the embryonic characters in any vertebrate resemble the adult characters of other vertebrates lower in rank."

The fact that so discriminating an anatomist finds evidences of four types of brain, and their consecutive unfolding, lends confirmation to other proofs of the unity of the human family, and affords a provisional scientific classification into races, based on internal conformations in connection with cranial structure. These races, however, could not have been evolved one from the other. A fixed type, after reaching maturity, produces only its kind. A new race comes from divarication while yet the lower race is growing; the two then developing on gradually diverging lines, the one which outstrips the other being, of course, the most advanced of the two, but not necessarily the higher type; for growth may be away from perfection, as well as toward it. Thus, there has been a constant branching off from the trunk, the races unable to keep up with the advance being the lower races, and the more vigorous branches keeping on toward the higher ideal. The development, however, may have been toward an undue growth of brutal characteristics, as well toward intellectual or spiritual superiority.

If we are correct in this, then the time when the conformations of the Adamite brain were Negroid in character was at a very early period in growth. If we bring together the Australian, the Hottentot and the ancient Peruvian, with their equal cranial capacity, we shall be able to see who the first men were, and where the divarication began. The first departure was toward the brain conformation of the Malays. This was on the Mongoloid line of growth, and may be traced in the Mound Builders, who possessed cranial characteristics nearer the Mongoloid than to the Negroid or the European type. On the other hand, the Dravidian is a development toward the ancient Egyptian, who was the most perfect type of ancient man, and who possessed a fully developed civilization at the very beginning of history. Somewhere in this upward progress, the human brain reached the definite conformation now preserved in the Malays. The third development is noted as resembling the American Indian in the conformation of the brain. Then comes the European, whose mesocephalic skull and perfected nature prove his direct descent from the first men; all other races being divarications from the main line of growth.

The brown race is the oldest, and the black, yellow and white races

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were developed therefrom. The oldest civilizations were the Egyptian, Akkadian and Chinese. The Egyptian came from the northeast, and the Chinese from the west, while the Akkadian seems to be nearly indigenous. The Akkadians, as their name indicates, were the sons of Ad, and we cannot be mistaken in identifying them with Ha-Adam, or *the* Adam of Genesis. When Ha-Adam was driven from the Garden to till the ground from whence he was taken, he found his way to Akkad. Indications are found throughout the entire region, and in Egypt, that the oldest peoples living there of which trace can be found had only paleolithic instruments, or were in the paleolithic stage of civilization. Here civilization began, and from thence it extended to other climes and peoples.

The conclusion to which science seems to be tending is, that the first men were a brown race which spread from the valleys of the Tigris and Euphrates east along the Indian ocean and west across Africa to America, developing ancient civilizations in Akkad, Egypt, Mexico and Peru, which have curious and striking resemblances. The origin of this civilization and of the earliest race divisions we believe to be recorded in the antediluvian chapters of Genesis; but the true meaning of this archaic record is destroyed by interpretations not less absurd than the old version of creation, which insisted that it was all accomplished in six days of twenty-four solar hours each.

This examination shows that the first men were Adamites and that there were no pre-Adamites, and also that there is nothing in Genesis in opposition to the conclusions of science with regard to the primeval races. The entire field is open to the broadest and most thorough scientific inquiry, and there is nothing in the revealed Word which anthropologists must accept as authoritatively negativing their conclusions, as there is and can be nothing in science antagonistic to revealed religion.

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THE PRINCIPLES OF VENTILATION.

By Richard Prescott, M. E.

[Read before the Albany Institute, December 20, 1881.]

The systematic ventilation of buildings, by special appliances, is of quite modern date. In the early periods of history, the construction of buildings was of such a character that the most essential features of ventilation were secured of necessity, and as an unintended effect. Thus, until the latter part of the tenth century, all rooms that were to be heated were furnished with a hole in the roof, through which the smoke from a fire built on a flat hearth in the middle of the floor escaped. In the sixteenth century chimneys were still rarely used, but from this time their employment rapidly became universal; they were, however, for the most part, built of sticks covered with a clay plaster. These chimneys were always associated with capacious fire-places, containing, on each side of the fire, benches or settees, while from iron bars placed across the throat hung heavy chains from which were suspended the pots and kettles used in the culinary operations. A great volume of air passed up the wide throat of these chimneys from the room, while to take its place streams of air entered through every crack and cranny. In such rooms the air was unquestionably pure enough to satisfy any one, but, save in the chimney corners, it was at the same time too cold for comfort. Indeed, a large room with a large fire-place at one end would become colder the hotter the fire was made.

That no attention was given to the subject of special appliances for ventilation in the seventeenth and eighteenth centuries is shown by the construction of the public buildings, and particularly the prisons of that time. The well-known investigation of Howard in the latter part of the eighteenth century revealed such an insanitary condition of affairs in the jails and prisons of England and on the continent that the world stood fairly aghast. Even that profession which should have been foremost in exposing the abuses heaped upon those unfortunates, whom either the law or disease had seized, was most conservative in its opinion and senseless in its practice. For we read that the physicians in the eighteenth century condemned their fever patients to be immured in rooms made as nearly air-tight as possible, to lie on beds beneath mountains of blankets, to look upon a red counterpane and red curtains, and, as a last refinement of cruelty, to have their small supply of drinking water dyed scarlet.

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Our interest, however, is more immediately with processes of ventilation actually practiced in our own time, and with the fundamental principles of the science of ventilation.

I. Standard of Purity.

Pure air, as understood by sanitary engineers, and as the object sought by ventilation, is a mixture of gases having a close approximation to the following composition:

Nitrogen	77.517
Oxygen	20.990
Water	1.460
Carbonic acid	0.033
	100.000

II. Impurities.

Many impurities are encountered in various places and in varying amounts. In-doors are the organic particles exhaled from the lungs and thrown off from the skin, and in bed-rooms from chamber utensils; excess of carbonic acid from respiration, and gas or lamp flames; carbonic oxide from too hot or leaky stoves and furnaces; hydro-carbons from the kitchen; sewer gases from plumbing fixtures and cellars, with their accompanying hosts of living germs; dust, consisting of organic material from carpets, upholstering and clothing, and mineral matter from wall papers. Out-of-doors are the fumes from manufactories; miasmata from low-lying regions, alternately flooded and left bare, and from depressions filled with stagnant water; dust from the streets; ammoniacal fumes from stable dung-heaps, with their myriads of germs; exhalations from cess-basins; and odors from privies.

Of course these out-of-door impurities cannot be removed by ventilation, but, in designing any system, they have to be taken into account so far as they affect the given locality.

III. Requirements of Ventilating Apparatus.

1. The amount of carbonic acid must not exceed, say, six volumes per 10,000 of air, since a greater proportion produces various unpleasant symptoms, as headache, lassitude and drowsiness, besides the more important effect of lowering the general tone of the body. In this connection it must be noted that carbonic acid, *per se*, is not a poison; its injurious effects are due to its replacing oxygen in respiration. In addition it has been shown that when carbonic acid has been produced

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by respiration alone, its amount is proportional to the amount of organic matter present, and this latter, owing to its prompt decomposition, is decidedly injurious.

The amount of carbonic acid present in the atmosphere can be easily determined, while the reverse is true for the organic impurities. A very simple method of determining whether a room contains more than the maximum allowed of carbonic acid is given by Dr. Angus Smith as follows: Fill a clean bottle, holding ten and one-half fluid ounces, with the air to be tested, then pour in one-half ounce of clear lime-water and shake it up with the air; if more than about six volumes of carbonic acid to 10,000 of air is present, a turbidity will be produced, due to the formation of carbonate of lime.

2. A second requirement is that the amount of moisture shall be no more than about fifty per cent. of saturation. When this limit is exceeded, the air is with difficulty prevented from acquiring and retaining an odor due to organic particles, since these seem to acquire a coating of moisture and adhere pertinaciously to clothing and furniture. Moreover, moist air prevents the proper and healthful excretion of perspiration. Very much less than fifty per cent. of saturation causes a disagreeable feeling of dryness.

3. It is desirable that the temperature of the air should be kept, as nearly as possible, at 70° Fah. in dwellings and about 68° Fah. in schools, churches and public halls.

4. No draughts must be perceptible. This condition requires that there shall be no general movement of air faster than two feet per second. To sum up the requirements, then:

1. Carbonic acid must be kept down to six vols. per 10,000.
2. Moisture must not exceed fifty per cent. of saturation.
3. The temperature must be maintained at about 70°.
4. The air in the room shall not move faster than two feet per second.

IV. Modes of Ventilating.

The various modes of ventilation may be divided into two great classes:

A. Natural ventilation.

B. Artificial ventilation.

By natural ventilation, I mean all processes which do not call for the application of force in any form, save that supplied by ordinary natural operations; and by artificial ventilation, those means which involve special appliances requiring the employment of force. There are two forms of natural ventilation:

1. Perflation.

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2. Gravitation by reason of the *necessary* difference in temperature of the air in-doors from that out-doors.

Ventilation by perflation is the most simple of all means, consisting in opening windows on opposite sides of the house. It is, of course, only applicable when the weather is warm, and in perfectly calm weather is only moderately successful. Perflation may be combined with an apparatus for cooling the air, and is then almost always successful. A method that I have tried with good results is, to hang three or four wet towels from sticks, supported at one end by the slats of the blind — the towels hanging perpendicularly to the window, on the windward side of the house. The effect is to cool the air by the absorption of heat consequent on the evaporation of the water. There is a distinct acceleration of the velocity of the incoming air, as might be expected. This combination however, is really an artificial method.

The method by gravitation is less successful in its operation than the one just described; it consists in utilizing the difference in temperature commonly existing between the air in a house and that outside. Doors and windows, at the bottom of the house, are opened and the scuttle is also opened, or else the upper sash of windows in the upper story are drawn down. In the case of a high, narrow house, this method gives fairly good results. Of course, the kitchen has to be shut off from the rest of the house, in order to keep culinary smells from circulating, and for a like reason the dining-room must at certain times be excluded from the benefits of the system. After a current has been fairly established, it will be found an advantage to open slightly, at the bottom, the windows of the lower stories on the windward side of the house, as these will then act as inlets. Like the method of perflation, this plan cannot be depended on. Just when ventilation and cool air are most needed, that is on close, hot, sultry days, the difference in temperature becomes so small that the exchange of air practically ceases.

The artificial methods of ventilation are divisible into two principal classes; first, Those employing heat directly; and, second, Those employing motors of some sort. The principle involved in the first of the cases is the same as in the natural gravitation method described above; that is, hot air has a lower specific gravity than cold air, and will rise if opportunity be given, while cold air supplies its place. In the direct application of heat, the source is either indirect radiation, direct radiation, or a combination of the two. It is to be noted that whatever may be the system of ventilation, in the cold months it must include the heating of the building, and in the summer the cooling of

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the building when necessary, according to the third requirement of perfect ventilation.

The most common, because the cheapest and most easily managed, apparatus on the indirect radiation plan, is the hot-air furnace. That there may be real ventilation with the use of this system, there are necessary — although commonly omitted — appropriate ducts for the removal of vitiated air. As applied in the majority of cases, this furnace has a cold-air duct, of rectangular cross section, measuring fifteen inches by six inches, or ninety square inches; hot air ducts, circular or elliptical in section, leading to the various rooms, and no means for the heated air to escape, save through cracks or opened windows. The cold-air ducts frequently terminate too near the ground, and in places where boys at play may throw things into them. There are cases in this city where, incredible as it sounds, the cold-air duct is omitted and the air supply taken from the basement, at the floor level. Comment on this procedure is unnecessary. It is not difficult to understand the reason for such faulty arrangements. With suitable inlet and outlets, more coal must be burned to maintain a comfortable temperature. It seems proper to say here, that no one can expect to ventilate his house without cost, any more than he can heat his house without paying for it. The relative cost of heating, merely, and heating with ventilation is shown in the following extract from a paper by Robert Briggs, C. E., published in the third annual report of the Connecticut State Board of Health.

"A certain school-room, when the outside thermometer stands at zero, may be kept at the temperature of 70° by introducing 150 cubic feet of air heated to 250° each minute. There is thus dispersed in heating 180° temperature that has been abstracted or taken away from 150 cubic feet each minute, or 27000° cubic feet. If we suppose in place of 150 cubic feet there is given for ventilation 1000 cubic feet each minute (50 scholars and 20 cubic feet each minute), it then happens that only 27° excess of temperature is demanded, and the heat of the influent air becomes 97° in place of 250°. But there is wasted each minute, in the one case, 150 cubic feet of air at 70°, which has been heated up from zero, = 10500° cubic feet, and in the other, 1000 cubic feet at 70° = 70000° cubic feet, or six and two-third times as much heat in case of ventilating as in the case of simple heating."

The above comparison is made between hot air furnaces for the heating and steam apparatus for ventilating. When the comparison is made between steam heated hot currents and steam heated ventilating currents, the numbers are 48000 and 97000, and these numbers represent "the ratio of heating surface, boiler surface and fuel consumed."

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The natural philosophy of the water pan in the hot-air furnace is not understood by many people; and the necessity of adding moisture to the air that has passed through a heater is actually denied by men whose habits of thought and occupation should make them zealous advocates of the practice. The capacity of the air for moisture depends upon its temperature, being greater as the temperature is higher. If, then, air be saturated at, say 25° Fah., when heated to 70° Fah., it will no longer be saturated, but its capacity for water vapor will be so much increased, that the air is properly described as dry. It is not anhydrous, of course, for there is just as much water, by weight, in the air as before the heating.

The use of steam-coils in place of the furnace is a decided advantage, for, so far as I have observed, no one goes to the expense of putting in steam apparatus without providing for the escape of the foul air; and indeed without these, indirect heating by steam is almost sure to fail —fortunately. Steam-pipes never attain the temperature of hot-air furnaces and the resulting hot air is generally of a better quality. A small steam jet supplies the moisture needed.

Heating by direct radiation is most commonly effected by stoves. With these in general there is practically no ventilation. The air next the stove is heated, rises to the ceiling and flows off toward the walls, then down to the floor, and so on. A small amount of air is constantly withdrawn to supply the stove, and a correspondingly small amount is drawn under doors and around windows to make good the loss. Good ventilation is not possible with stoves, since there is no way of heating the air before it enters the room. One point in favor of stoves is their economy in fuel. A stove will ordinarily give out nearly ninety per cent. of the surplus heat in the fuel, after deducting the amount necessary to make a draft in the chimney.

Heating by direct radiation from steam-pipes and hot-water pipes is not necessarily accompanied by any change of air. In this connection I ought to say that the heat radiated from surfaces which, like steam and hot-water pipes, are usually not more than 212°, amounts to but little and is not perceptible at a distance of from ten to twelve feet. These appliances really heat principally by conduction and convection.

The grate fire is an excellent ventilator, so far as removing foul air is concerned, but it tends to produce drafts near doors and windows, It heats solely by radiation and is very wasteful of heat, not more than about 10 to 15 per cent. being utilized. As I shall presently show, the open grate is a highly useful adjunct to other systems of heating, but alone and simple it is a poor source of heat to rely on, save for small rooms.

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Open grates of the Franklin or Galton style are excellent as ventilators and economical in the use of coal. The most modern of this kind of grate is that manufactured by the Open Stove Ventilating Company of New York. These grates have a hollow back and hollow sides, through which cold air, brought by a special flue from outside, circulates and escapes into the room, heated through radial openings in the top, just over the arch of the fire-place. The current of heated air enters the room, having an upward and outward direction, and after describing a series of loops which include all parts of the room, sweeps back and into the fire, supporting combustion, and finally escaping through the chimney. This is evidently a combination of direct and indirect heating. The direct radiation being the same as with the simple open grate, while the hot air poured in the room represents an amount of heat saved, which in the case of the simple grate passes up the chimney, doing no useful work. I have not seen this apparatus in operation, but several scientific men have examined it, and report that its real performance is close to what the theory of its construction calls for.

A stove and grate combined, called the "Ideal," has lately been placed on the market in this city by the Magee Furnace Company of Boston, of which I am able to speak from experience, having one in use at my house. When used as a stove, the "Ideal" is simply a very cheerful looking base-burning stove, neither better nor worse than other stoves as regards ventilation. When converted into an open grate, however, which is done by removing the front, thus exposing a bed of live coal, it acts as a vigorous exhauster. It is better than the simple grate, because it continues to radiate and conduct on all sides like any other stove, while removing air from the room as rapidly as the simple grate. On one occasion, by way of experiment, the room was filled with smoke, and the change made from stove to grate, when immediately the smoke in the air was observed to stratify, so to speak, and rapidly disappeared, passing into the fire in long filaments. The temperature of the room, it must be added, falls rapidly after the change is made — in the case mentioned, falling from 80° to 73° in about half an hour.

A combinational system of direct and indirect heating with ventilation is to heat air by steam-pipes in the basement, and convey it to some central locality on each floor, and then by a small, simple grate fire in each room, draw out the heated air and pass it up the chimney.

An example of such a system, slightly modified, is afforded in a residence designed and built by the architect, A. W. Fuller, of this city, for Mr. Geo. W. Van Slyke, and of which the following is a description. The main hall is 16x24 feet, and has direct communication with all rooms of first story, and, by a large well-hole, with the second story.

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This hall is supplied with fresh air taken from the outside and heated to about 60° by passing over coils of Gold's steam radiators, and thence through a register capable of supplying 12,000 cubic feet of air per hour. This is distributed into all the rooms by means of open doors and transoms. The parlor and sitting-room are each heated by indirect radiation described for main hall. The dining-room and all the chambers are heated by radiators placed in the room. Each room has an open fire-place, and, to insure perfect circulation in the flue, there is a coil of steam-pipe in each flue, so that in case the fire-places are not used, the process of ventilation is not interrupted. By these means a continuous supply of fresh warm air enters the rooms and the foul air as continuously passes out through the fire-places. All the chamber doors have head-lights opening into the hall, which remain open, thus supplying a sufficient amount of warmed, fresh air to all sleeping apartments. The temperature in all rooms is about 65° Fah.

Ventilation by motors consists in forcing air into the rooms of a building by fans, or drawing it out by fans, or both, or using a fan to supply fresh air and an exhausting chimney to withdraw it. The heating is accomplished by causing the air to pass through a chamber containing steam-pipes, either before it passes through the fan, or, preferably, after. Air may be cooled in summer by passing around pipes containing cold water. The ventilating system of the New Capitol includes two sets of fans — one forcing air into the rooms and the other drawing air out; and in addition each office has an open fire-place. In the Johns Hopkins Hospital a fan is used to supply air, and the withdrawal is effected by a stack, at the bottom of which a fire is kept burning.

Many devices have been patented and are for sale, claiming to be more or less efficient in compelling an air movement in a given direction. Of all of these it may be said that in calm weather they are no better than a simple open pipe, and many of them are worse, by reason of the obstruction they offer to the escape of air. It is equally true that when the wind blows they assist the movement of air very materially. Revolving cowls are liable to gather rust about the axis, and be sluggish in their movement, giving chance for a reversal of the column of air which they control. One piece of apparatus, claimed to be a ventilator, should be mentioned on account of the curious faith in its efficacy shown by numbers of people. It consists of a flat, circular fan-wheel fixed in an aperture in a sheet of metal that replaces a pane of glass in a window. When its cover is removed it commences to revolve, increasing its speed until, if there is considerable difference in temperature, it whirls very rapidly, emitting a loud hum, and seeming to be very energetically at work. A moment's reflection must convince

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any one that the wheel is turned by the current of air entering the room, and that if it were removed the current of air would be increased. However, it gives information to the eye and ear that fresh air is coming in.

The particular system of ventilation and heating to be applied to a building depends upon its use, size, etc. For dwellings, the plan described for Mr. Van Slyke's house, or the open-stove apparatus, is preferable to any others, but a small open grate, working in combination with an ordinary hot-air furnace, will give very good results. Merely providing exit flues for the hot air will make a furnace a very fair ventilator and heater.

For schools and churches the indirect method is, I believe, the only one practicable; since any direct radiation, to be effective, will prove unpleasant to those in its immediate neighborhood. A method of heating and ventilating such buildings as churches and the theaters very satisfactorily is to force air by a fan through a pipe chamber, and then through a system of pipes to long boxes, the front sides of which are the risers of the platforms on which the seats are placed, these risers being perforated. A series of vertical slits in the side walls communicate with an exhaust stack or flue, in which a coil of steam-pipe is placed. The distributing pipes from the fan are carefully arranged, their dimensions and directions being such as to secure the delivery by each one of the same amount of air. A separate system of pipes supplies each gallery, and the chancel or stage, as the case may be. This plan is in actual operation in one very large theater in Italy, and in several theaters and churches in New York City.

It is quite practicable, however, to ventilate such buildings as I have described, and also schools, by heat alone, all that is necessary being to provide an upcast shaft of sufficient height, and kept at a high enough temperature.

A school building in Bridgeport, Conn., now in course of erection, is to be ventilated according to this plan. Four rectangular flues, measuring in cross section 10 by 14 feet, extend from the basement to the upper story. At the bottom of each are several steam-pipe chambers — one for each room to be heated — from which hot-air pipes extend (within the main flue) to the school-rooms. The hot air enters the room, in one corner, eight feet above the floor, and escapes, after traversing the room, through an aperture at the floor level, in the same corner with the inlet. The outlets open into the main ventilating flue, which is kept warm by the hot-air flues within.

When a very large building is to be ventilated — as for instance the Capitol at Washington, or the New Capitol at Albany — the problem of so apportioning the ducts that from one central point a sufficient

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amount of warm air shall be delivered in each room, and the foul air brought back, is dependent for its successful solution on such fine adjustment, and involves so many conditions, that it may better be abandoned. Certainly, in the two cases just mentioned the success has been very moderate. For such vast structures the ventilation should be distributed.

For the purpose of studying the ventilation of an apartment, one should supply himself with the apparatus of Dr. Smith, which I have described, and with a number of discs of tissue paper fastened to threads, to be hung from various points, to show the existence and direction of currents. I am indebted to Dr. F. B. Lincoln for the neat idea of using the tissue paper in discs, rather than in strips, as has long been done. The advantage of Dr. Lincoln's plan being that the disc is acted on by only a small portion of air, while a strip may feel the effect of several currents.

In bringing this paper to a close, I beg to remind my hearers that vitiated air is an undoubted cause of consumption, and the certain promoter of all other diseases. And that in close, unventilated churches and theaters much of the effect of sermon and performance is lost, because the ears that hear are partly deadened by the imperfect removal of the impurities of the blood, and at the same time the clergyman is unable to deliver his message with the energy naturally his own. Public sentiment should compel the perfect ventilation of every public hall in the city by staying away from every place where that condition is not found.

When such public sentiment shall have developed — as develop it surely will — the devout churchman, the enthusiastic admirer of the drama and of music, and the earnest school boy, may follow their bent with infinite profit, and without the danger of laying the foundation of wearisome and tormenting diseases from inhaling the exhalations of some hundreds of others.

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ANNUAL ADDRESS.

By the Hon. PAUL A. CHADBOURNE, LL. D

[Delivered April 11, 1882.]

THE PHYSICAL SCIENCES THE PRODUCTS AND PROMOTERS OF CIVILIZATION.

Mr. President and Gentlemen of the Albany Institute:

As the ship is crossing pathless seas, to the careless observer there seems to be the same waste of water beneath and the same unchanging heavens revolving from day to day above. But the commander, at stated hours, observes the place of star and planet and marks upon his chart the daily advance toward the desired haven. So in the progress of the world, there is to the majority of men no clearer notion of the real advance of science than there is to the ordinary passenger at sea of the position of the ship that carries him. They have a general notion that the world is drifting on, because from time to time some new scientific discovery arrests their attention, as would the blowing of a whale or the sight of some distant island break the monotony of a long sea voyage. It is well then for societies like this to have set times for observing the scientific heavens, that they may report progress and make a point on the scientific chart for a new departure. Such a time is properly the anniversary occasion. As you have honored me by an invitation to aid you in this work, I would gladly do something to exalt the physical sciences, and especially to mark their true place as elements of human progress.

In the enchanting stories of the Arabian Nights, we read of the "slave of the ring" and "slave of the lamp" that transported men, opened treasure-caves and reared stately palaces at the command of their masters. To those who are so ready to see a hidden, double

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meaning in every old myth, it might seem that these wonders of the Arabian Nights were dim prophecies of the marvels performed by modern science. Some of the physical sciences stand like Titans ready to wield a power that braids iron bars like straw and moves with a single stroke of the piston a thousand ponderous wheels. They train the lightning for a servant, and from dull clods bring out colors that vie with the rainbow in its glory. They reveal the past history of the globe, read from the leaves of stone the history of the world from the ages when the old Silurian seas rolled over the Empire State till the present day, unlocking the caves of the earth, revealing the gold and silver in a thousand hills and the coal and iron that, as physical agents, rule the world. They have revealed the laws of vegetable and animal life, making the flowers we cultivate more beautiful, the fruits more delicious, the herds in our fields more prolific and even the rivers, lakes and the ocean itself to teem with more abundant life, for the delight and support of man. If one would be impressed with the service of the physical sciences, let him pass through the streets and business centers of this city or any other in our land. He need not visit the observatories to view the wonders of the heavens, nor the halls of science where strange and wonderous forms are embalmed in stone, but in the products of the marts, in the furnaces that pour out molten iron, in the boats that defy wind and tide, in fruits and flowers that have gained deliciousness and beauty in our own time, will he see something of the wonders physical science has wrought for man. Or go to the great Centennial Exhibition and see the products which science has gathered from the earth, and the power and skill by which these products are fashioned into forms for use and beauty. No dreams of the old Arabian Nights surpass the marvels of this scientific age. These physical sciences are both the products and promoters of the modern civilization. In human progress, action and reaction are in the same direction, the exact opposite of mere mechanical law. While human progress seems at first sight to rest on physical science, the human mind must construct science, and therefore must ever move on before it in its highest activity. The sciences in their perfection simply mark the pathway of the human mind, as the dead coral, with its cells and rays, marks the growing pathway of the coral polyp, or as the builder stands upon the course of granite which his own hands have laid, to rear still others for the completion of his work. It is useless to plan and labor for the progress of science while we neglect the careful training of the human mind, the instrument through which all these wonders have been achieved — wonders that will cease to multiply the very day men become content with mere practical science, and shut out the scientific

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mind of the world from the means of scientific research, and that mental training which scientific research demands. The history of science from its earliest dawn to the present day, is proof of the position we wish to maintain, that while we boast of science as a promoter of our civilization, this science itself is the *product of civilized mind;* and in any progress in time to come, the mind of man must be the moving and guiding power, peering into the darkness, making new discoveries, gathering materials, controlling forces, forming classifications, which when completed are given to the world as science, before which some seem ready to fall down as before a God that has created the wonders of modern times. But this God of science is itself a creation — the creation of that mind made in the image of Him who created the worlds. It is this thought that I wish specially to illustrate and enforce.

It is in the savage that we mark the first mastery of nature through thought — that thought that builds upon the experience of others and gives the first condition of science and of progress for the race. No mere animal, from thought or choice, makes provision for its own improvement or that of its race. If improvement comes to the animal at all, it comes from *without*, impressed upon it by the conditions of nature or by man. Its physical nature is, indeed, plastic, and through its plasticity the animal changes for its own good in the struggle for existence, and also to subserve the uses of man.

But in every implement of savage life, rude though it be, there is promise of unbounded progress. The bow may be of oak or ash, but it is fashioned according to the fancy of the owner and for a purpose which its owner understood while yet the stick from which it is fashioned was growing in the wood. The bow was a mental conception before it was formed or the string adjusted in its construction. And the art of making and using the bow must be transmitted from father to son by instruction. That simple bow in the savage hunter's hand is as truly a product of thought and marks its owner as plainly above the highest animal in kind, as does the repeating rifle or telegraphic cable.

In every bundle of arrows chosen from the straightest rods and tipped with flint; in the graceful canoe of birch or skin; in the paint and feathers with which the savage makes himself hideous, are the tokens of a progressive power from *within* the man. In every one of these rude attempts at art and science, *thought* went before the act. The man moved and guided himself in the work. The necessity or desire came, and by the power of thought, physical forces and material products were made instrumental to supply his wants. Some one more thoughtful, more cunning than the rest, took an upward step

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and marked the path for his fellows to follow. And all the gross conveniences of his savage home are the results of many such steps by succeeding generations. And rude as these products of his thought are, they are unlike *in kind* the perfect work of the instinct-guided beasts and birds around him, and have in them the germs of all civilized productions. They give promise of unending progress, not by their perfection — for the works of bird and insect far surpass them — but they give evidence of unending progress because they show their maker's power to go before the act in *thought*, to consider material products in relation to his wants, and to meet these wants by contrivance of his own, originating new combinations and yet building upon the experience of those who have contrived before him.

But in savage life much of the study of nature's forces and of her products has arisen from bodily wants alone. The plainest utility has marked every step of the savage, except in his rude attempts at art. *Science for its own sake, thought for its own sake,* producing results for the present unusable, are to him apparently unknown. It is only when these are found, the cultivation of thought for its own sake, that we have the first gleam of that intellectual progress of which the present civilization is both the *offspring* and *parent*. Thought or investigation for *its own sake*, the love of knowledge AS AN END, is the pillar of cloud by day and the pillar of fire by night that has guided the race in its onward march in civilization, while *utility* alone would have kept it forever in the desert of savage or half-civilized life. In this realm of pure investigation, the leaders of the race have labored since there was any promise of a science, and long before science gave promise of *utility*. In that same realm the leaders still walk to-day. The world is enriching itself now with the products of their former labors — labors performed when this same world sneered at them as useless. The laborers themselves come back from time to time to gather the products of former labors, as a means of advancing still farther. But should they heed the cry of these wise men, "the practical men," falsely so called, and remain in the realm of mere practical utility of to-day, all progress would stop and our civilization would become fixed, like that of China and Hindostan. Not a single physical science can be named that has not been built up by the labors of men who were seeking for truth, while their labors were considered puerile and ridiculous by mere utilitarians. And the best scientific results of the present day, which have not yet borne fruit, the questions that engage the attention of our scientists, are recounted with the same sneers and ridicule by those who claim to be practically wise, as were observations in geology and experiments in electricity a century ago. Every great advance in practical science in the last half century

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has been simply the combining or utilizing of materials and results wrought out as isolated products or facts, by long years of careful investigation, by the patient truth-searchers in all portions of the world. When these practical results are reached, the crowd will throw up their hats and exclaim "*Great is science!*" and with the same breath call that humbug which is preparing still greater successes for the next generation.

Let us interrogate the sciences or appeal to their history in proof of our assertion. Whence came our telegraphs that now link the nations together? If you would answer that question, you must go back to Franklin, to Galvani and Volta, to Ersted and Arago, to Grove and Daniel, to Henry and Faraday, and their co-workers, men whose names are seldom whispered in connection with the telegraph, but whose labors in accumulating facts, discovering laws and inventing instruments, made the electric telegraph a possibility in our day. It was no telegraphic line, nor oceanic cable with its round dividends in gold that urged them on, but love for nature's laws, the charm of tracing this wonderful physical force — the lightning of the storm — in all its manifestations. And thus through years of thought and labor for the love of science alone, the conditions were preparing for the wonder of the nineteenth century to spring as by magic into full perfection.

One practical thought seemed to do the work, as one spark calls out the force that hurls the shot and shell; but that practical thought would probably never have existed except as a flight of fancy in some tale of magic, or if it had existed as something desirable and possible in real life, it would have been as barren of results as a grain of corn on winter's snow, had it not been for the preparation made by those who labored for the love of original investigation, paid only by the discovery of nature's laws, without one thought of other gain.

What shall we say of Chemistry, that worker of wonders, transforming waste products into wealth and changing daily the conditions of life by its new products and applications? The old alchemists produced some meager results, indeed, while searching for the philosopher's stone and the elixir of life. But for the origin of true Chemistry we must look to that illustrious band of whom Black and Davy and Lavoisier were the types — men who asked for nothing higher than to unfold the laws of nature in the constitution of water, air and earth.

The time has come, indeed, when Chemistry, like almost every other physical science, is so full and complete in its facts and established principles as to become truly deductive. Materials are so abundant and methods of work so perfect, that practical life has but to suggest its wants to have them supplied. But they are supplied, directly or

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indirectly, through work done before the want was known, and from materials collected, perchance, as the mere curious rubbish of men who would delve in science, the world knew not why.

Thus every physical science presents in itself perpetual proof that the thought of man is ever ranging beyond it for new materials; that it is itself only the perfected, organized product of past thought.

We are re-stocking our rivers with fishes to the wonder of the people as well as to their profit — sixteen millions of profit already reckoned in the Empire State; but we are doing it under the instruction of those who studied the habits of fishes when legislatures saw nothing but folly and waste in giving money for the study of "eels and horn-pouts." We can do something to protect ourselves from the insect hosts, but we do it mainly through the studies of those who were content to bear the sneers of the "practical men" who saw nothing but childish folly in studying "bugs and butterflies."

We can without pain endure the dentist's forceps or the surgeon's knife; but this priceless boon to suffering humanity resulted from experimenting with curious compounds that came into being through love of science alone. Compounds of such wonderful powers were not dreamed of till they appeared in answer to the chemist's constant search, through love of his science.

We rejoice that the world is reaping such rewards from the labor of scientific men. But we would have the world remember, for its own sake, the price which has been paid for its great scientific possessions. We would have credit given to whom credit is due, not for any good that can come to the laborers, most of whom are beyond the reach of all earthly rewards, but for the good of the present and coming generations, that they may know the toilsome pathway along which the builders of science have trod, and that they may also learn that the real advance of science must evermore lie in a region beyond apparent utility. We would have them realize the fact that science is the gift of mind — not of mind simply crowded with facts, but of mind trained to observe and compare, boldly pushing beyond the bounds that limit the vision of those who see nothing but the practical utilities of to-day.

Modern science, then, is the thought of the past put into most effective form for present use. As such it is a mighty magazine of power. It is in the mental world even like the beds of coal as accumulated force in the physical world. And by the diffusion of knowledge every man may become armed with much of this accumulated power — the accumulated thought of the past. This garnered power of thought finds its full expression in our railroads and steamships, in telegraphs and cotton mills, and in the wonderful transformations of

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the chemist's laboratory. It predicts every change on the dial-plate of the heavens and photographs the falling drop of rain. It thunders and destroys in all the enginery of modern war.

An agency such as man never before wielded are the physical sciences to-day. As such they bring the whole race to a plane of civilization impossible without them. But standing high above the masses, the few explorers see still higher hills, where in coming time shall be a broad highway prepared by patient workers, for those to climb and shout for science who see no use in all the labor till the road is ready for their use.

While natural science, then, is nothing but an instrument, and one prepared by man, it is an instrument which he prepares for his own use and for his own advancement. It is the means by which one generation rises higher than another, standing upon the towers which the other raised. As an instrument, natural science is like iron that forms the hammer, chisel and anvil, by which other masses of iron can be fashioned into more curious and useful forms; or it may be likened as a whole to two of the most wonderful scientific products, the telescope and microscope, instruments which are the product of thought, but when once fashioned opening new fields of thought as they bring within our view the extremes of the universe — the wonders of the heavens and of a single drop.

As an instrument, as the product of civilization, we would now inquire into the relations of natural science to the permanency and progress of the civilization which produced it. Among the greatest of all triumphs of science, in its influence on civilization, are the means which it offers for intercourse among the nations. Men run to and fro, and knowledge is increased in the earth. The iron car thunders along night and day from ocean to ocean, and then the vessels that defy both wind and tide complete the circuit of the globe. And from this great artery of travel branch off a thousand lines to every portion of the earth. The work of months is thus crowded into days by the forces called into action and directed by modern science.

And as though these swift messengers were not enough to bring the world into sympathy, science stretches its wires across the continent, sinks cables along the ocean's bed, and now through the water and the air the lightning has become the messenger of thought. Every event of importance in the world becomes upon the same day, if not in the same hour, the subject of thought in every center of civilization on the globe. The thought and impulse of the nations in all questions of universal interest move on together like the hands of the electric clocks in a great city.

No longer is there danger that any of the important arts will be

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lost. The knowledge and improvement of any practical science or useful art originating in any nation becomes the property of the world before a single year has passed. In former times, such knowledge was too often like the single standard of measure kept in the House of Parliament, which, when destroyed by fire, not even the mathematics of the whole kingdom could replace. These arts and sciences now in their wonderful distribution, are like the new standard with its exact copies distributed throughout the kingdom. No conceivable catastrophe could destroy them all.

And the rapidity of improvement corresponds with the means of communication. The same experiment may be now tried in a hundred places at the same time — the results be compared and conclusions reached in a single year, that once required the life-time of a generation.

All that renders life desirable in knowledge or product may be transmitted from one portion of the globe to any other, equalizing the conveniences and luxuries of life. And poor and unfortunate in the last degree must be the man who cannot transport himself and household gods to any portion of the earth that offers new attractions for him.

Science has made the globe very small — a journey of but a few weeks at most, and of but a few hours for thought — but it *widens the area* of the globe for the *spread of civilization.* With its new appliances, man defies the rigors of a northern zone and lives in comfort where, without its aid, life would be impossible or reduced to the rude form of savage existence. Much of that zone of the earth where are now gathered large cities with the most wealth and refinement, the greatest means of enjoyment, the best conditions for the improvement of the human race, without the fruits of science would have remained a wilderness inhabited by savage or half-civilized tribes, or by a sparse population, wringing the bare necessities of life from a scanty soil.

It is science quickening art, perfecting its processes and rendering them certain, that provides support for the dense population which the most rapid growth and highest scale of civilization demands. Without science, dense population becomes a mere struggle for existence; but with the products of science, we may welcome compact population as the condition of the highest enjoyment for all.

If there is a possible overstocking of the earth for some gloomy Malthus to dream about — predicting wars and famines — it must take place in that uncertain future when the coal shall be exhausted or the sun be dim for want of fuel. For untold ages to come, we know that science as it now is will increase the enjoyments and improvement of men as population becomes more dense; and with the possible advancement in science, we dare not assign a limit to the means which

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may be enjoyed by coming generations for social, mental and moral improvement.

As a product of mind, that gives solid returns in money and goods, science becomes a stimulus to mind that reaches to the masses. With such means of intercourse that the same problems are subjects of thought at the same time in all parts of the world, and with such wonderful instruments for physical research as are already invented, we may well boast of science as a promoter of civilization, as a broad basis upon which it may now rest to build higher courses upon which to advance. It is not strange that these results charm men. They are worthy of admiration. It is not strange that an instrument so powerful should be exalted above its maker — that science should become to some a divinity with power of self-revelation — the giver of every blessing — that grand guide and prophet of future good on which the hope of the race should center. Men look to physical science not only as an agency destined to become more powerful as an advancer of civilization, but as sufficient of itself to bring to man all the good he can enjoy. To this view we object, and utter our earnest protest against it in the interest of science itself no less than in that of race. We claim that the advance in science has come from knowledge of method, and that knowledge of the true method of investigation came from the study of man, his powers and their proper use. We claim that there is nothing in natural science that is self-directive even in securing physical good; that it is a mere machine which must be brought into action by the same cunning workman that prepared and organized its parts; that it has no power to secure justice or purity or truth, except as it appeals to the higher tribunal in man, a tribunal which science never organized and for which it can never become the substitute. That tribunal, the MORAL REASON, is in man like the pilot to the ship, while physical science is the moving power which fills the sails or turns the ponderous wheels — a force like the wind bringing destructive tornadoes that will founder the ship without the pilot's skill to avert its force, or like the steam that shatters and destroys except when controlled by valves and pistons as the engineer directs.

We wonder at science, indeed, but we wonder at it most of all as a product of human thought. It is indeed a revelation of the thought and plan of the Creator in the physical universe, but the revelation was meaningless as science, till the human mind, the image of God, put letter and line in place and proclaimed the mysteries of matter and force in common language for the instruction of the thousands unable to read the mystic signs in earth and sky for themselves. As an invention — a discovery, an instrument, an agency — science promises to accomplish all its admirers can claim in giving power and the

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conditions of progress to the world. That it promises stability to civilization we gladly admit. That it promises accelerated progress we joyfully hope. That it increases man's power we know, but that power needs control and direction, or it may prove a curse or be totally lost.

The world is now wild on the question of physical science. Like the achievements of a hero that has done much, its results are exaggerated; or like the riches of a rich man, the sum increases with every repetition. The very wonders of science are the basis of wild speculations impossible to be realized. There are wild dreamers who know something of what has been accomplished, and little of the time and labor required for securing the results already reached. Science is extolled for what it has done, and sneered at with the same breath because it cannot do more. But still the cry is, "More practical science." "More production." "In that is our hope." "All else is 'heavy guessing,' or a remnant of the past to be buried out of sight."

Amid all this clamor and din and glare in which the multitude seem confused with the sounds and bewildered by the cross-lights, until they rush with the crowd and shout the cry that seems to be in the ascendant, let us listen to the voice of reason. Let us appeal to experience, the history of the past. Let us scan physical science with that keen searching method by which it has been built up. Let us turn clear, scientific light in upon science itself. Let its triumphs be revealed. Let us comprehend all its capabilities that we may know what it can possibly accomplish. And where, I ask, in the past results or in its present capabilities are found the power of controlling man, the power of bringing the individual or the race on to that high plane where true manhood reigns — the plane of *right*, of *justice*, of *purity*, of *truth* and of *good will to man* which leads to labor and to the sacrifice of self for the advancement of all mankind to this higher plane?

We look in vain to physical science for such a result. It may give light, but it never gives *strength of purpose;* and its light is that which comes to show the extent of the disaster that has befallen us, rather than a light ever shining upon a path that leads away from all danger. For guidance and self-control we are to look within man to those powers by which he comprehends moral relations — to that moral nature for the approval of which a good man will lay down his life — under the guidance of which physical science and its products are means to be used or rejected as they hasten or retard the progress of the man toward that true position of moral dignity where manhood in its perfection becomes more noble and more glorious than all of the visible universe besides. Under this guidance he is self-poised and stable, because it leads him and links him to God Himself. Along the pathway where the moral nature leads there is an illimitable road of

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progress for man to travel, even if science were to make no further advance and production never exceeded its present limit. Do what the moral nature of man demands in obedience to the moral law, and you have multiplied the power of science for good a hundred fold. Stop the waste of *intemperance* which science has made possible for the world; the waste of *carelessness* which science can never correct; of *recklessness* which science never cures; of *prodigality* and *luxury* to which science indirectly supplies the means; of *dishonesty* which science too often aids; of *war* which science every year renders more terrifically destructive to labor and the products of labor by the Titanic efforts of nations to surpass each other in the armor of ships, the weight of guns and the destructive power of projectiles. Stop all these terrible agencies, in all their forms; agencies over which science has no more control than the water that thunders down Niagara has over its own movements — stop all these and turn all this wasted energy into another channel, put it under the control of that principle in man that seeks his own highest good and the good of the race — under the control of an enlightened self-love and benevolence — and the world would change as by enchantment. The light of civilization would be freed from clouds and mists and shadows, and break forth with the brightness of the morning sun. Science itself would advance with a rapidity unknown before, for its votaries would be multiplied, their powers be strengthened, and their means increased. The multitude that now grovel in the low plane of sensuality would rise into the sphere of rational enjoyment, and freedom would no longer be confined to one portion of the globe, now advancing and now retreating before anarchy and despotism, but she would walk with an assured step and dispense her blessings in every land. Such is the promise we have from man's own nature, when those principles rule in him which make him the image of God — in right of which he has dominion over all the earth.

The dangers of this age are not that practical science will be ignored or neglected, but that its proudest achievements may prove a curse through misdirection; that honor and honesty and patriotism and philanthropy may be weakened and overwhelmed in the strife for gain and power.

Man, who can trace the planets in their courses, must learn to direct his own steps. He who can control the lightnings, must learn to control his own passions. He who can reclaim the earth from wildness must cultivate the rich garden of his own emotional nature. He who can cross pathless oceans mid darkness and storms by the guidance of the magnetic needle, must seek for some guide that shall conduct him safely through the doubts and darkness that beset the pathway of

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every bold adventurer in thought. For such guidance and for such power of man over himself we must look beyond the sphere of physical science. The guiding-star to all permanent progress is found in the firmament of man's moral and religious nature. When this is acknowledged and the study of man's moral nature is exalted as the center toward which the studies of youth should converge and from which the acts and influence of every man should radiate, then will our civilization reach the full splendor of which it now gives only feeble promise, and then shall we see new triumphs of physical science, the great motive power in the progress of the world, guided, controlled and utilized by man ever guiding and controlling and utilizing his own powers. Then only shall we see the true relations of physical science to civilization, and never till its true relation is seen and acknowledged, will it have stable growth and give its full blessings to the world.

MEMBERS OF THE ALBANY INSTITUTE — I cannot close this discussion without inviting your careful attention to what I consider to be the office and duty of all such organizations as you represent. In your complex and comprehensive plan you embody and symbolize the character of modern civilization which Guizot has graphically contrasted with the ancient civilizations, presenting as they did only some single phase of human activity and development, or that uniformity of thought and activity that naturally ends in such fossilized civilizations as China and India present. All questions that relate to the progress of science and the social welfare of the race properly come before you for discussion and illustration. In this way you secure individual advancement, in which is the only hope of the world, for organizations are but aggregations of individuals, and can rise no higher intellectually or morally than the elements of which they are composed. But organizations have certain powers which belong to no one of their number. Organizations live while individuals die. Organizations, therefore, can bring to bear upon the same problem the labor and observations of its ablest men for generations, and carry on to completion grand undertakings where the most gifted individual would fail. There is also an aggregate influence in combined numbers such as no one man can wield. When a new truth is reached, organizations can defend it with power against the onset of opposers, and in the important work of its dissemination they can overcome obstacles and multiply agencies where individual effort would be powerless. The possession of these peculiar advantages brings upon such an organization as the Albany Institute a great responsibility as a promoter of every branch of science. The world at large will give no heed and help to investigation till it begins to promise money returns. How long it has taken our States

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to make appropriations for scientific research! And in almost every case the hope of finding metals or coal or of securing some kindred money advantage has been the moving force in deciding the legislator's vote.

New York did a noble work in so early and efficiently inaugurating her scientific surveys, and richly has she been paid in the instruction of her people and in the honor she has secured among our States and the nations of the world. This Institute was the first memorialist in favor of this great scientific movement. Wise legislators gave the means of studying the rocks of New York, thus laying a foundation for the grand superstructure of American Geology. The ablest scientists of the nation were called by your Executives to carry on the work. The way had been prepared by Clinton, Van Rensselaer and other honored names among the early patrons of science. The labors of Eaton and Beck, of Torrey and Emmons, De Kay and Hall, and others who still have their armor on, have instructed the world in the whole field of Natural History and made the rocks of the Empire State an everlasting monument to the wisdom and liberality of your early statesmen. We trust the race of statesmen has not deteriorated, but that the work will go on till all the treasures of science which the State possesses are made accessible and free not only to all her people but to all the people of the world who will visit her vast collections. To the early statesmen there was only a promise and possibility of results; for those of the present time there is the stimulus of work already done. Your scientists have certainly vindicated their tireless energy and their ability to enter new fields of observation and research. Your Botanists and Zoölogists have described the living species, your Geologists have not only given names to the rocks but to the thousand extinct forms within them, so that the superb volumes of the Natural History of New York are a necessity in the library of every working naturalist. Your Henry, in this very city, discovered the principles that made the telegraphic cable possible, and your Morse gave the practical hint for surrounding the earth itself with electric nerves, so that it responds to the will of man as though it were a living thing. One touch of his finger can now move the globe, not convulsing it as dead matter, but quickening it as an obedient agent of his will, transmitting the commands of him who was made to rule the earth.

You, as an organization, have all you can desire as an inducement to careful work and courageous advance in time to come. And as an organization you are to press on and encourage other searchers for truth to enter that advancing morning twilight of scientific discovery where untrained eyes see no light of the coming day. How many great questions still remain for patient watchers and tireless workers

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to answer! The best inductions of history are yet to be made, and the most weighty social and political problems are yet to be solved. The history of our earth is, as yet, but a disconnected story. The introduction and progress of life on the globe, and the origin and age of man, as scientific questions, give rise now to the most conflicting opinions drawn from meager and uncertain data. To meet these questions successfully there is need of patient research, broad training and sense of deep responsibility for observations reported and theories promulgated. The great retarder of science is hasty generalization, especially if it be made by a man justly entitled to authority and respect for any work he has accomplished. The false theory will vitiate books and misdirect the labors of many till its author is dead. And it is a blessed thing for the progress of the race that individuals die while society and organizations live. The earth will be true to herself and will in time reveal her full history and the history of the races of beings that live upon her. We need to observe with care and to gather abundant materials for thorough investigation. This work can be done most successfully by organized effort — by just such labors as your Institute is fitted to perform. But while you look to science as a whole, and seek its enlargement and perfection, I beg you to remember that man, *as man*, is the crown of all; and you can advance science only as you advance men in intellectual and moral power and social well-being. The education of the young, the constant progress of men of all pursuits in those things that promote life, health, comfort and moral and intellectual growth, should be the leading idea in all your work; and then the growth of science will be as natural and sure as the springing of the blade in the warmth of May and the maturing of harvest in the golden autumn months.

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PREHISTORIC MUSIC.

By Armand de Potter.

[Read before the Albany Institute, May 10, 1881.]

In bringing before you a subject which for the present, at least, is more scientific than æsthetic, more geological than musical, it would perhaps have been better to call it a geological wonder. You may have heard of the subject under the name of "Singing Stones," or "The Geological Piano," but I would rather call it Prehistoric Music, a name which seems to me more fitting. A few weeks ago, when on a visit to the metropolis, I had the honor of being introduced to Mons. Baudre, the discoverer and owner of the wonderful flint stones, of which I shall endeavor to give a short account. In going to M. Baudre's house, I must confess I had but little faith in music drawn from stones, and expected only to hear a doleful sound, such as I have heard when staying with an Arab tribe, who had certain stones from which they obtained sound and music enough to dance by. I was therefore greatly surprised when I heard the musical sound as M. Baudre struck the first stone, it seemed so sweet and wonderful. Seldom have I experienced more pleasure, than when I heard this gentleman sing an air to the pure musical tones of his flints. It seemed as if we were suddenly carried back six thousand years. I decided at once that this marvelous music had once been that of the young world, and on mentioning the idea to M. Baudre, he said with enthusiasm that it was the opinion of most archæologists, and indeed his own. There is no doubt that the flint was the first weapon, the first tool, and produced the first fire, and until the comparatively recent invention of matches, I think it was universally used for that purpose. Prof. Newberry, of Columbia College, says: "In all probability, the resonance of sonorous stones constituted all the music of the man of the Stone Age."

I have spoken of having heard the Arabs draw musical sounds from stones, but a stronger proof in favor of the belief that the flint was the first sonorous body heard by man is that the demi-savages in Abyssinia used just such an instrument of nature to call the people to war, and for other purposes. An English missionary brought three such stones, which form the Abyssinian instrument, to London, where they can be seen in the Kensington Museum.

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The wonderful part of the music is, that it is drawn from the rough natural stones without any polish or cutting whatever, while all other musical instruments have been shaped and polished, and are nothing but industrial products, in which strength and volume must be observed in order to obtain the desired effect. M. Baudre says: "I must call your attention to the fact, that iron or ingots of gold or silver, as also rock crystal, in their natural states, are quite free from vibrations; flint on the contrary vibrates in its natural state, and does not, like the former, require polishing and change of shape in order to become sonorous." So we may consider it a fact, that the first musical note that God gave to nature was deposited in the cold heart of that stone which is also full of fire.

You all know of the colossal statue near Thebes, called by the Egyptians the Vocal Memnon, from the sounds emitted from it. I remember wondering while I examined it, why stone apparently so cold and silent should be called the singing statue. But now it seems quite possible, and I only look forward to the discovery of some papyrus that will tell the story of a colossal musical instrument. That sounds were heard is confirmed by undisputed records. They were listened to by Hadrian and his ill-fated queen Sabina, and a host of other historical personages. Some historians also say that the rude Roman soldier, unused to any other sound than that of the trumpet, listened in silence to its voice. It has been said that the sound heard from the statue was due to a blow, and this was no doubt the true cause. The Egyptian priests were crafty men, always working miracles, and they alone were allowed to ascend the rocks, which were on one side of the statue. There in the crevices, the Arabs of our own time often conceal themselves, and for amusement strike a piece of granite, which sends forth a sonorous and metallic sound which rings all over the plain.

To return to the stones in possession of M. Baudre, they are twenty-seven in number, and are suspended from a string, which, not being a good conductor of sound, allows the vibrations of the flints to be produced in their purity. The stones are rough, just as they were taken from the quarries, and are of different sizes. M. Baudre says, that there is an absence of the proportion which is indispensable in instruments of music, for three stones of the same weight and volume may produce very different sounds, while two stones, entirely unlike in weight and volume, may correspond to the same note, which is a fact that at present cannot be explained. He says also, that cutting the stones, as a general rule, has the effect of destroying the purity of the sound. So it was necessary to seek the note formed by nature, without regard to the shape of the lumps. Repeated experience has

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shown him that the gravity of the flint is in direct proportion to the number of irregularities on it; thus a long flint may give a good result if it is, to some extent, regular in shape, but the full extent of the vibrations is only obtained when the flint is full of projections and cavities. Yet flints long and absolutely flat on each side may produce fine effects, always on condition that the flint is perfectly homogeneous. As a rule, it is necessary to strike the stone on the smoothest surface to obtain the most perfect note; the sides opposite to the smooth, produce disagreeable multiple vibrations. The stones used to strike the flints are free from all sound. The collection forms two chromatic scales, commencing on D, and ending on upper E sharp, and the strings to which they are suspended are about two yards in length.

M. Baudre devoted twenty-four years to making this collection, wandering with untiring perseverance through the departments of Haute Marne, the Somme, Perigord, Artois, and lastly the basin of Paris. More than two hundred thousand stones were tested before deciding upon the fitness of a single one. He was led to make the search, which resulted in acquiring this geological wonder, in the following manner. In 1851, he was superintending the works of a railway in France; the workmen came upon great quantities of flint which, producing a faint sound, attracted his attention. It seemed to him a whole revelation, and he immediately thought it might not be impossible to find in those quarries something useful to the musical world. It required nine months of searching before he found the first one that gave a satisfactory sound. He then began to regard his discovery as belonging to the realm of science, rather than something to be exhibited in concert halls as a mere curiosity, and only thought of founding a geological collection of musical stones. Encouraged by the result of his first truly sonorous stone, he continued his search at his own expense, often laboring day and night, and thus in twenty-four long years he obtained the desired result, and had his geological piano complete. He considers these sonorous flints very rare, especially those with so pure and charming tones.

However this may be, such a collection must remain almost unique, for although there may be more stones, it would be difficult to find another man to seek for them, with so much patience, perseverance, and ardent enthusiasm as M. Baudre has shown. One of the stones was once in the possession of Mr. Boucher de Perth, who valued it from its resembling the head of a Sphinx. When M. Baudre saw this stone in the museum of Abbeville, he remarked to the mayor of the city, who was with him : "That stone would speak if I touched it." The mayor, rather astonished, desired him to try it, and handed him the stone. He touched it slightly with a small stone, and to the

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astonishment of all present, he drew from it a marvelously pure and sweet musical sound.

When Rossini went, the same year of his death, to see M. Baudre, he admired especially one of the stones which has a form of a thigh — he told him he thought it must be the bone of an old musician.

Some French poet has written the following lines:

"Ah, qu'on ne dise plus: Aussi froid que la pierre —
Les pierres ont une âme et cette âme une voix
Vivante, harmonieuse et pleine de mystère.
Honneur à l'Enchanteur qui leur a fait des lois."

Victor Hugo also wrote him: "Patience is not enough; it needs the original and fruitful idea; it needs faith, without which nothing grand can be undertaken. All this you have had, and you have achieved the impossible, the incredible, you make the stones sing. Virgil, that other enchanter, had only known how to make them weep. You are the poet predicted by the Roman orator who said, 'Rocks and deserts answer to your voice.' This truly prehistoric harpsichord, these more than ancient keys, astonished without doubt at repeating our most modern airs, have recalled to me the aerial, I might almost say celestial chime from the lofty bell tower of the Cathedral at Antwerp. There is then in the words of Chateaubriand, "A voice in the stone, and the hard flint, from which flame darts, is also the source of harmony."

"Stirred by Amphion's Lyre, stones from the glebes
Skipped to their places on the walls of Thebes.
You to our ears a greater wonder bring,
Beneath your touch the flints divinely sing
The lovely music charms both ear and heart.
And we exclaim as wondering we depart;
Sure to these rustic notes, in Eden's glade,
Eve must have danced while father Adam played."

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THE CORRECT ARMS OF THE STATE OF NEW YORK.

FIRST PAPER.

By HENRY A. HOMES, LL. D.

[Read before the Albany Institute, Dec. 2, 1879.]

The people of the States of the New World, who have become independent of the monarchical governments of Europe, have all adopted certain emblematic devices, by which they are recognized among themselves, and by the rest of the world. These emblems they employ upon their public buildings, their flags, their seals, their medals and in other ways. They consist of a shield and crest, and other insignia, which they call the Arms of the State, and the symbols are calculated to awaken in friend and foe due sentiments of respect. In devising these Arms or Ensigns, they have imitated their former rulers, whose monarchies from the times of the crusades have employed such signs, most frequently called coats of arms, as badges of honor and discrimination. The usage has been so systematized and developed, as applied to families and States, as to give rise to that special art, called the science of heraldry.

As a people we have no yearnings for heraldry, or for coats of arms, except as a means of symbolizing a State by some sign of a lofty idea or aim, or of its characteristic traits; and in this spirit all the States and Territories within the Union of the United States of America, and also many of the cities and towns have adopted the custom of using each a special symbol, as the state or city arms. By and through this symbol, the State, its presence, its dignity, its property, its authority and the relation of individuals to it for obedience and love, are declared with most effective emphasis. The devices on the arms of these many States are extensively known and easily remembered by all men interested, because they are perpetuated without any changes except in unessentials, as of the drapery of the figures, or the arabesques or scroll work surrounding them.

When, however, we come to our own State, the great State of New York, we find that for many years past there has existed great uncertainty, even among the best informed in the State, as to what is the exact and genuine device of its State Arms; and in the community generally, those who should be requested to state in an informal way

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what are the arms of New York, would be unable to answer with tolerable correctness except that at least all, recalling "that banner with a strange device," could probably say, "I know that the *Motto* is Excelsior." Enquiries are frequently made from other States at the public offices for a correct copy of the Arms, and whatever answer is sent, it is with doubt and hesitation.

I am glad to be able to say, that I think that the information which has been accumulated, from the date of the Centennial year of 1876, makes it now possible to set forth the true Arms of the State in an unquestionable form, and in their original beauty and force.

The first and only device of Arms that was ever made for the State was prepared by a committee, appointed by the New York Provincial Congress in the year 1777. In the Journals of that body, we read the following, under the date of April 15:

"On motion of Mr. Morris, *resolved*, that a committee be appointed to prepare a proper device for a great seal for this State; and that Mr. Morris, Mr. Jay and Mr. Hobart be a committee for that purpose."*

The Congress adjourned in less than one month thereafter; and of what was done on this subject by the three distinguished members of the committee, Lewis Morris, John Jay and John Sloss Hobart, nothing is recorded in the journals of the Congress or the Convention, because the disturbances of active war on the Hudson river, either prevented protracted meetings or general business previous to the first meeting of the legislature in 1778. The next mention of the State Arms is, after the adoption of the Constitution of the State of New York of 1777, at this first session. In the first general law, the one for the organization of the government, and passed March 16, 1778, it is said that the device prepared by this committee was adopted.

The language of the Statute of 1778 so far as relates to the Arms and Seals is in these words:

"And whereas arms have been devised for this State, and two several seals have been devised and made, one of the said seals as and for the great seal, and the other as and for the privy seal of this State, (and which said seals are now in the custody and possession of his excellency the present governor):

"Be it therefore further enacted by the authority aforesaid, that the said arms and seals shall severally be and they are hereby respectively declared to be the arms, the great seal and the privy seal of this State."

A subsequent clause in the section declares that such matters as were issued under the seal at arms of the governor of the colony shall issue under the new seal; and a clause in section five requires the person

*Provincial Congress of N. Y., Journals, vol. I, p. 882.

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administering the government to "deliver to the secretary of the State descriptions of the device of the said arms and seals, hereby declared to be the arms, the great seal and the privy seal." These several extracts embrace every mention of the word Arms throughout the law.*

In April, 1786, an act was passed which authorized the issuing by the State of $200,000 in bills of credit; and it declared, "upon which bills shall be impressed the Arms of the State of New York," and no mention is made of an impress of any seal of the State upon the said bills. The Arms are once more mentioned in the law in speaking of the engraver to engrave them.†

Eighteen years afterward, a law of January 26, 1798, provides for a commission of three public officers to repair or cause to be made a new great seal, after such device as the commission shall judge proper, but it makes no allusion to the *Arms* of the State. It simply requires that a written description of the seal shall be preserved in the secretary of State's office.‡ This commission however in making a new seal record the description of it in 1799 in these words: "The Arms of the State complete, with supporters, crest and motto, around the same, The great seal of the State of New York." They then describe the reverse. They do not pretend to have devised new Arms, and while they have not followed closely the old device, they do not appear by the terms of the law to have had any authority for any changes which were made by the artist.§

A law of March 20, 1801, like the preceding one, regarding the great seal and the privy seal of the State, uses the following language:

Sect. 5. "The description in writing of the arms and of the great and privy seal of this State, recorded and deposited in the office of the secretary of this State shall remain as public records; and the arms and great and privy seal aforesaid, of which descriptions in writing have been deposited and recorded as aforesaid shall be and continue the Arms, the great seal and the privy seal of this State: . . ."‖

This law makes no further mention of the Arms, but merely continues to speak of the two seals.

May 27, 1809, a law was enacted authorizing the secretary of State to make a special seal for his own office, of such device as the governor

*Laws of the State of N. Y., Greenleaf's ed., vol. I, p. 181.

†Laws of New York, Greenleaf's ed., vol. I, p. 241.

‡Laws of New York of 1798, p. 249.

§The commission consisted of S. Jones, S. De Witt and J. Ogden Hoffman. Their report, filed January 22, 1799, may be found in the first volume of the folio entitled "Official Seals," in MS. in the secretary of State's office. Also, see N. Y. Civil List, ed. of 1880, p. 469.

‖Laws of N. Y., Webster & Skinner's ed., vol. I, p. 205.

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should approve; and a new great seal with a written description, to be preserved in the secretary's office. This law of 1809 makes no mention of the Arms of the State.*

A law passed Feb. 25, 1813, does not differ from the law of 1801 except that it includes a seal for the office of the secretary of State, under a like requirement for the preservation of a description of the Arms. Chap. XIV, Sec. 6, requires "That the descriptions in writing of the Arms and of the great and privy seal of this State and of the seal of office of the secretary of this State, deposited and recorded in the office of the secretary of this State, shall remain as public records; and the arms and great and privy seal aforesaid, and the seal of office of the secretary, of which descriptions in writing have been deposited and recorded as aforesaid, shall be, and continue the arms, the great seal, and the privy seal, and the seal of office of the secretary of this State."†

The State Arms are not again mentioned in this law, nor in any law of this State since that date, except as they are mentioned in the revised statutes; and the language in the last edition of 1875 relating to the Arms and Seals, is the following:

"*Sect.* 20. The description, in writing, of the arms of this State, and of the great and privy seals, and of the seal of office of the secretary of State, deposited and recorded in the secretary's office, shall remain as public records; and the said arms shall continue to be the arms of this State, and the said seal of office, to be the seal of office of the secretary of State." ‡

The declaration that there is somewhere a standard Arms of the State, that can be appealed to, is here very emphatic; and the importance of the declaration will be seen in the sequel.

Of all the descriptions of the arms and seals alleged to have been deposited and recorded in the "secretary of this State's office," not one can be found, I am assured, except a brief description, without heraldic detail, of the seal of 1809. The search for these descriptions has, I believe, been repeatedly made during the last thirty years; their disappearance, if they ever existed in the office, is not a recent one.§

This memorandum containing the description of the great seal of 1809, describes a picture, having as a basis the arms of this State,

* Laws of N. Y., 1809, Chap. 141, p. 135. A description of this seal of 1809, signed by Gov. Tompkins, and an impression of it may be found in the volume of Official Seals, Secretary of State's Office.

† Laws of N. Y., Van Ness & Woodward's ed., vol. I, p. 458.

‡ Banks' Ed. of Revised Statutes, 1875, vol. I, p. 525.

§ N. Y. Geneal. and Biog. Record, vol. III, p. 18. — N. Y. Civil List, ed. of 1857, p. 429.

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which is drawn up in heraldic language, but is none the less defective if regarded as a complete description of the Arms. I quote it in a note as being of record in the secretary's office. *

From all these extracts from the laws which I have read, and they embrace all the laws relative to the subject that I have discovered, it does not appear that the first device of Arms adopted by the State has ever been changed by statute. Nor in the journals of the legislature, from the time of the adoption of the Arms to the present time, is there any evidence of an attempt to change them by legislation. These laws, authorizing changes in the *seals* of the public offices, do not entail as a consequence, or even suggest, any change in the State Arms.

The Arms of a people, containing symbols and emblems, adopted under the influence of and exemplifying the ideas and principles of an especial crisis, are of too serious moment to be subject to be changed in accordance with the peculiar fancies of individuals in each successive decade of years. And if changed at all after some new grand crisis, the change should not be made regardless of the prevalent laws of the science of heraldry. Thus it is almost without example in accordance with its laws, that one or both of the two supporters of the escutcheon should be in a sitting posture, as they may be found on some of the seals of the State, and in pictures alleged or supposed to represent the State Arms. The word "incumbent" or "recumbent," applied to the seal of 1809 in the New York Civil List is used to contradistinguish the modern seal from the pendent seal of earlier days, and not to the supporters as lying or sitting. The name of *supporters*, given heraldically to the figures by the sides of a shield, implies that they should be standing. Additions may more appropriately be made to a shield than changes may be made in it: as in the case of annexation of, or of union with a new State.

I must add that no *printed* description of the Arms of this State, as devised and adopted in 1778, has been found to my knowledge in

* Copy of the memorandum of 1809 in the secretary of State's office:

"Description of the new great seal of the State of New York, procured in pursuance of the act entitled 'An Act relative to the office of secretary of this State, authorizing the making of a new great seal and to amend the act entitled an act concerning oaths.'" Passed March 27, 1809.

Argent. A rising sun proper.

Crest. On a wreath a demi globe and an eagle passant regardant all proper.

Supporters. The figure of justice on the dexter, and liberty on the sinister side.

Motto. Excelsior.

Legend. The great seal of the State of New York.

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any early printed document of the State; nor has there been found a line, in any early document or memorandum printed or written anywhere, touching the arms or *the seals*, authorizing both of the figures of Justice and Liberty, or either of them, to be seated.

It might be conjectured by some persons that the changes which were from time to time made in the seals implied a change in the Arms, on the assumption that the word *arms* was merely a name for the central portion of the seal. This assumption is without foundation, because that, when in 1778 the great and privy seals were decreed, the Arms were also decreed as a separate thing. The proof of this is given in the specimens of the seals of 1778 annually reprinted in the New York Civil List, where we see that the devices of the seals differ from the device for the Arms. The first seal had on the obverse side a sun, rising behind mountains with the motto, Excelsior, and the legend, "The great seal of the State of New York." On the reverse, was a rock amid the ocean, with the legend, Frustra, 1777. At the same time, the Arms were made having among other emblems Liberty and Justice as supporters of the shield.

It will not have escaped notice that the resolution of the N. Y. Provincial Congress of 1777 called for a seal only; while the law of 1778 declares the existence of and adopts both Arms and Seals. We may be allowed to suppose that the committee having provided a seal with a portion of what is now the Arms, with an obverse and reverse, as for the pendent seals which have a seal on both sides, judged it necessary to set forth an Arms complete as a substitute for the colonial Arms formerly in use with the Royal escutcheon, looking forward to the time when they would be also upon the Seal. The section in the law of 1778 providing for Arms speaks of the Governor's "Seal at Arms." And so twenty years having elapsed before the subject was again reached by the legislature, the Commission under the law of 1798, speak in 1799, of the new great seal, as having the "arms complete," as if they had completed a work which had been intended for the great seal from the beginning.* Embarrassment had been felt on account of the contrast between the Seal and the Arms, and therefore the new seal was made to embrace the original Arms of 1778, with modifications, which there was authority to make, as regards devising a seal; but as the law of 1798 makes no allusion to the Arms, consequently it gave the commission no authority to make changes in them.

The whole interest of this essay turns upon the fact, that having, as I hope, produced a strong conviction in your minds, that the Arms of the State have never been changed by statute or legal authority,

*N. Y. Civil List, ed. of 1857, p. 427.

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and then shown that the written description of them has apparently been lost, I am now able to adduce the strongest evidence of what was the original device,—evidence which in most respects is of more value than a description would be. The evidence consists in three specimens of the State Arms which have been preserved as they were engraved or painted before the year 1785, a date which is within eight years of the first passage of the law for a State Arms; and each one of the three is impressed with a measure of official authority.

The *first of these early specimens* is a copy of the Arms as they are engraved upon a military commission signed by Gov. George Clinton, June 25, 1778, the commission itself being dated within about three months after the passage of the law of March 16, 1778. Mr. Edward F. De Lancey, president of the Westchester Historical Society, a master of the mysteries of heraldry, who first brought this specimen to my notice, gave a photographed copy of it to the State Library. He thus speaks of it in a letter to me dated July 8, 1878:—

".....The whole form of the commission is engraved upon a copper plate elegantly executed, about eight by ten inches in size, the arms being in the upper right hand corner. .....I never saw or heard of it till this week.....It is as fine a piece of copper plate engraving as I know of executed in America. I have had the elegant initial letter T in which the arms are used as an interior ornament, photographed. The engraver's name is Dawkins, and he is I believe the same man who made the first *seal* of the State.....He lived at Poughkeepsie. The date of the commission is June 25, 1778.... ....The photograph of the T is only a trifle larger than the original .....This commission is a general military commission, and could be used for any rank of field or company officers, blanks being left to be filled as required."

The commission was for Daniel Mortine, as second lieutenant of Capt. Samuel Haight's company of Westchester county, in Col. Samuel Drake's regiment. The initial letter T was for the first word of the commission, *The*. The first clause of the sentence reads, "The people of the State of New York."

In this specimen the shield is much broader at the base than in the two following specimens, for a reason which will afterward be explained. The scales of Justice are held clear of her body, and the sword is not held firmly erect. The drapery of the figures though not classic is more agreeable than in the third specimen. As this specimen is the first in order of time and is employed upon a military commission signed by the Governor, it necessarily takes precedence over the others as having more direct official authority.

Mr. G. R. Howell of the State Library has kindly furnished a blazon of the Arms on this commission, that should have technical exactness

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so far as possible, regard being had to the failure of the engraver to indicate color by the usual mode of dots and lines, and to the modern costume of the figures.*

The *second specimen* of the Arms is one which was painted upon the flag of the Third New York Regiment commanded by Col. Peter Gansevoort, Jr., during the revolutionary war. The regiment had been raised and recruited by him in 1777, and its first active service was in defense of Fort Stanwix on the Mohawk river, where it made a successful sortie against the forces under Gen. St. Leger. The colonels of the three New York regiments had petitioned the Committee of Safety to be furnished with colors as early as Nov. 30, 1776. But this regiment was still unprovided with a flag. The knowledge that the flag, which they had improvised during the investment, had been made with portions of the garments of some of those within the fort, induced the preparation, in the year 1778 or 1779, of the beautiful stand of colors for the regiment, which is still reverently preserved in the family, although much tattered. With the kind consent of its

*Blazon of the Arms of New York as engraved on the Military Commission of 1778, by Mr. George R. Howell.

Arms. Azure, in fess, the sun rising in splendor, or, behind a range of three mountains, vert and half irradiated, at their base forming a grassy shore; in base a ship and sloop under sail, passing and about to meet, on a river (or strait) irradiated, bordered by a grassy shore fringed with shrubs, all proper.

Crest. On a wreath argent and vert, an eagle proper rising to the dexter from a two-thirds of a globe, showing parallels of latitude, and the Atlantic ocean with adjoining outlines of the equatorial portions of the two continents.

Supporters on a quasi compartment formed by the extension of the scroll.

Dexter. Liberty, her face, neck, arms, and hands proper, the feet in socks; vested in a short tunic, uncinctured, fringed at bottom, demi-sleeved, over a gown reaching to the feet. Over all, a broad sash vert, festoony, depending from under her sinister arm to her dexter hip, and thence from a fastening nearly to the ankle. In the dexter hand a staff ensigned with a Phrygian cap, the sinister arm embowed, the hand and fore arm behind and supporting the shield; the sinister foot resting on a royal crown dejected.

Sinister. Justice, her face, neck, arms, and hands proper, her feet in socks; vested in a short tunic uncinctured, fringed at bottom, demi-sleeved, over a gown reaching to the feet; over all a broad sash gules, crossing bendwise from the sinister shoulder to the dexter hip; bound about the eyes with a fillet vert (?); in the dexter hand a two edged sword, cross-hilted, erect, the middle point resting against her dexter shoulder; the sinister arm embowed, the hand holding out from the person her scales proper.

Motto. On a scroll argent, in sable, Excelsior.

Observations. A slight amount of scroll work is employed for ornament above the shield.—No indication of color by dots or lines is given on this engraving, except in the cases of the wreath, the sash of Liberty, and the sash and fillet of Justice, where the lines represent the colors above given, but may have been intended only as an artist's shading.

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present possessor, Mrs. Abraham Lansing of Albany, it was unfurled with great ceremony at the centennial celebration at Oriskany in 1877, exciting a thrill of admiration in the fifty thousand people assembled there.

The regiment remained at Fort Stanwix (Schuyler), till June, 1779, when it marched to take part in the Sullivan campaign of that year. During 1780 it was with the main army under Gen. Washington in New Jersey. In January, 1781, the 3d, 4th, and 5th N. Y. Regiments were consolidated with the 1st and 2d. Col. Gansevoort, Oct. 15, 1781, being at Albany, was sent by Gov. Clinton as General of brigade to maintain the authority of the State in the direction of Vermont.* Gen. P. Gansevoort, in 1864, wrote with his own hand a declaration that that flag was also "borne at the surrender of Yorktown in 1781," † having been carried probably to the 2d Regiment, and allowed to be used on account of its history and beauty, and for the sake of the battalion from the 3d Regiment which had joined it. It was afterward returned to Gen. Gansevoort at Albany. Whether the flag was present on that occasion or not, its value is enhanced as a specimen of the true Arms of New York in proportion as the date when it was painted, approaches the year 1778, when the law establishing the Arms was passed.

I have entered into more details regarding this flag than would have been necessary, if it had not been that a State appropriation in 1879 was made to secure a copy of the Arms "taken from a flag borne at Yorktown in 1781," which was expressed in these terms: "For the secretary of State, for the purchase of a colored picture of the arms of the State taken from a flag borne at Yorktown by the American army in 1781, to be deposited in the State Library, the sum of fifty dollars." ‡

The doubt thrown by the researches of Maj. Gardner, on the truth of the alleged fact, led to conclusions as stated above, which made the flag still more valuable as a witness to what are the correct Arms, than on the assumption made in the law appropriating money for the painting.

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* Some of the preceding statements respecting the history of this regiment have been condensed by me from a much longer sketch in MS., for which I am much indebted to Prof. A. B. Gardner, LL.D., Judge-Advocate, U. S. A., now in New York City.

† Albany Army Relief Bazar: Catalogue of Relics. Albany: 1864. 8vo.

‡ Laws of 1879, May 13, Chap. 272.

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The Arms are carefully and finely painted upon both sides of the flag, which is of dark blue silk, and about seven feet square. The Arms complete cover upon the flag a space of about four feet four inches wide by three feet five inches high; the two figures are each two feet two and a half inches high.

Acting again in the same kind spirit as I before mentioned, Mrs. Lansing has afforded the utmost facility for securing an exact copy of this venerable flag for the purpose of the law. It has been beautifully and perfectly painted on canvas in oil colors by Miss Annie Wrightson, of Albany. The copy is one-half of the size of the painting on the flag.

This second specimen presents some striking departures from the first, chiefly such as were introduced by the fancy or carelessness of the painter. It has the great value of being the first specimen which we have in colors; and the colors of the drapery differ considerably from those employed in the third specimen. The expression of the features of the head of Liberty is peculiarly winning. Of the Arms on the flag I am able to subjoin a more technical description, as before, through the kindness of Mr. Howell.*

*Heraldic description of the Arms on the N. Y. Regiment Flag of 1779.

Arms. Azure, in fess the sun rising in splendor, or, behind a range of three mountains, proper; in base the sea wavy.

Crest. On a wreath argent and gules, an eagle proper, langued of the last, rising to the dexter from a two-thirds of a globe showing the Atlantic ocean, and a part of the Eastern and Western continents in outline.

Supporters. Supporters on a quasi compartment formed by the extension of the scroll. Dexter, Liberty, her hair brown, her face, neck, arms, hand and feet proper, the last sandalled and stringed gules; vested in a close fitting waist, demi-sleeved, having lapels falling over a gown, reaching to the feet, both cloth of gold; a mantle gules depending from the shoulders behind to the feet; a ribbon azure passing from the sinister shoulder bendwise under the dexter breast; in the dexter hand a staff, ensigned with a Phrygian cap, or, the sinister arm embowed, the hand supporting the shield; the sinister foot resting on a royal crown dejected.

Sinister. Justice, her hair brown, her face, neck, arms, hands and feet proper, the last sandalled and stringed gules; vested in a close fitting waist, demi-sleeved, having lapels falling over a gown reaching to the feet, both of cloth of gold; a mantle gules, depending from the shoulders behind to the feet; a ribbon azure passing from the dexter shoulder bendwise under the sinister breast; bound about the eyes with a fillet proper; in the dexter hand a sword erect resting between the forte and middle parts on her dexter shoulder, the sinister arm embowed, the hand holding out from her person her scales proper.

Motto. On a scroll argent, in sable, Excelsior.

Obs. One branch of scroll work is used for ornament over each supporter, terminating at the wreath. Finer scroll work borders the outer edge of the shield.

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The *third of these specimens* of the State Arms is a painting on canvas, which was first hung up in St. Paul's Chapel, New York City, on the south wall, in 1785. It was suspended over the large square and canopied pew occupied by Gov. George Clinton, and opposite to a similar pew on the north occupied by Gen. Washington, one of them having been the pew of the Provincial governor during the British possession of New York, and after the burning of Trinity Church in 1776. At "some dreary day of modernizing"* the painting was locked up along with the painting of the Arms of the United States. After a few years, they were suspended in the porch; but both were restored to their original places about the year 1857. The dimensions of this picture of the New York Arms are 67 by 45 inches.

In 1875, the authorities in Philadelphia, preparing for the centennial celebration of 1876, were desirous of securing paintings of the arms of the original thirteen States for suspension in Independence Hall, and they applied to Mr. De Lancey, whose name I have already mentioned, for a copy of the New York Arms. Mr. De Lancey regarding this painting justly as the most correct and ancient picture of the Arms then known, by his personal exertions obtained an appropriation in the supply bill of 1875 of six hundred dollars for the purpose of having copies of it made. It reads: "For the governor, for the purpose of procuring two paintings on panel-wood or metal, of the arms or heraldic device of the State of New York, one to be placed in the State Library, and the other to be placed at the disposal of the committee on the restoration of Independence Hall, Philadelphia, six hundred dollars, or so much thereof as may be necessary." † The object of the deposit in the State Library was to diffuse and perpetuate a knowledge of the genuine State Arms. The first two specimens which we have just mentioned having since been discovered, had not come into public notice. We give in a note a description of this painting of the Arms in heraldic language, made and published by the Rev. B. R. Betts, of New York City, in place of the description of the copy which was made for the State Library in 1875, and which differs from the original painting in some respects.‡

*History of St. Paul's Chapel, N. Y., by Rev. Morgan Dix, D. D., 1867,—Rev. Mr. Betts, in the N. Y. Geneal. Record, vol. III, p. 116, on the Heraldry of St. Paul's Chapel.

†Chap. 634, Laws of 1875.

‡Blazon of the Arms of New York from the St. Paul's Chapel painting of 1785, by Rev. B. R. Betts.

Arms. Per fess, the sky in chief and the sea in base, the upper half of the Sun rising out of the latter, all proper.

Crest. On a wreath vert and argent the northern half of the terrestrial globe, of the second, the meridians sable, a spike projecting from the pale of the last;

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Besides these two copies, a third was made for the Centennial Exhibition in Philadelphia for the Hall devoted to the Women's Pavilion for the Works of Women. This copy was embroidered by Tiffany & Co., on a light colored silk, and was in size about fifteen by twelve feet. The expense was paid by collections made for the purpose from the women of the State of New York, under the auspices of Mrs. Howard Townsend. By means of a second appropriation of the Legislature in 1878, obtained upon the request of the same lady, another copy, the fourth of the same painting, was made for the Mount Vernon Association, to be hung up with the arms of the other States in the mansion at Mt. Vernon.

Having now given a history of these three earliest known specimens of the Arms, and accompanied each one with a scientific description, it seems necessary and unavoidable that I should describe particularly the earliest specimen in language which shall be clear and sufficiently exact, avoiding as much as may be possible technical terms, and that I should at the same time indicate the points wherein the second and third differ from the first.

ARMS. *Shield.* At the base of the shield of the first specimen, a shore of land is seen fringed with shrubbery, beyond there is an expanse of water smooth and calm. In the two later specimens the water commences at the very base of the shield, in the second it is in commotion, and in the third it is calm. Upon the water a ship and a sloop are seen advancing toward each other. Upon the second and third there are no vessels. Beyond the water appear in the two first three mountains, the central one being the most elevated. In the Library copy of the third there are mountains, but on the painting in St. Paul's chapel it is clear that the sun rises directly from the water without mountains. In the first and second two-thirds of a sun, with a great effulgence of rays, appears beyond the mountains.

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above it, but not touching, an eagle rising proper, to the sinister, his head reflexed below his breast, grasping in his beak his dexter talon.

Supporters on a quasi compartment formed by the extension of the scroll or Dexter. Liberty, hair brown, decorated with pearls, proper, face, neck, arms, hands and feet also proper; sandalled gules, vested vert; depending from and behind her shoulders a brown mantle, in her dexter hand a pole sable, spiked at the foot or, thereon a Phrygian cap argent, the sinister hand resting on the shield. Sinister. Justice, her face, neck, arms, hands and feet proper, sandalled gules, her hair brown and flowing, decorated with pearls, vested in a brownish gray, cinctured about the waist azure, the cincture fringed or, bound about the eyes with a fillet sable, depending from and behind her shoulders a mantle as the cincture, holding in her dexter hand a sword erect argent pomelled and hilted gold; in her left depending by a ribbon gules, her scales, the beam sable, the strings as the ribbon, the scales, round, or.— From N. Y. Geneal. and Biog. Record, 1872, vol. III, p. 119.

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Crest. An eagle, with its head and front of its body directed to the right of the shield and its wings spread, stands upon a two-thirds of a globe, with parallels of latitude; it shows outlines of a portion of the east coast of the New World and of the west coast of the Old World. The eagle of the second specimen very nearly resembles that of the first. Neither of them should be supposed to have been drawn to represent what we call an American eagle, but only the traditional heraldic eagle. The eagle of the third specimen conforms more nearly to our usual notion of the eagle, but it has the peculiarity that its head is turned to the left, while its feet do not touch the globe, but it hovers over it in flight. The word "America" is painted upon the globe, and there are drawn meridian lines in addition to the parallels of latitude.

Supporters. The figure of Liberty is on the right of the shield, and is completely dressed in a robe, with a mantle falling from one shoulder, and passing in front below the waist. In the second and third the mantle resembles an imperial cloak, spreading out behind on both sides of the robe, and somewhat shorter. The robe reaches to the feet, which have socks upon them, while in the second and third they have sandals. There is no belt at the waist in the first or second, but there is in the third. Besides the face and neck, the hands and fore-arm only are nude. The same is true of the other two. Her left foot rests upon a crown, which is overturned. In her right hand she holds an upright staff with a liberty cap upon it, and her left supports the shield with vigilance and firmness. In the second specimen also the foot rests upon a similar crown; in the third specimen the crown lies *at* the foot of Liberty. In the St. Paul's Chapel picture in New York, in addition to the crown overturned, there is lying under the crown cross-wise a sword and a sceptre.

On the left of the shield the figure of Justice stands, with a robe similar to that of Liberty, with a long waist, having lapels but no belt. The mantle passes from behind over her left shoulder down in front across under the right fore-arm. The same style of cloak is worn in the second and third as by Liberty. In her left hand she holds an even balance; in the two earliest specimens, it hangs away from her body, and in the St. Paul's Chapel specimen directly in front of her body. In her right hand she holds a sword with the point upward, but her arms down in the two early specimens, the elbow touching the shield. The sword is raised higher, with her hand touching the left point of the shield, in the Chapel specimen. Her eyes are blindfolded in all three of them, but she seems anxiously and intently listening to

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reach the truth. The face, neck, hands and fore-arms only are exposed. It is so also with the second. In the third nearly the whole arm is bared.

Her feet are covered with socks in the first two, and sandalled in the last specimen. The first two have no belt at the waist, in the last one Justice is belted.

Motto. The word Excelsior, painted upon a scroll, upon the ends of which stand the supporters, alike in all three of the specimens. There is a mantling of scroll-work over all the three specimens.

The next representations of the Arms, the nearest in time to the Chapel painting, were on the New York copper tokens of 1786 and 1787. There were issued four varieties of copper coins in those years known by that name, and even a gold piece of the same size. They were struck at Birmingham, England, as a means of profit for speculators in New York City, and all bore upon them some portion of the Arms of the State.* One of them, having on the obverse the figure of an armed Indian chief, had on the reverse, a rudely cut but lively picture of the complete Arms, the supporters markedly holding up the shield, although each one is on the wrong side of it, and the head of the eagle is turned to the left. None of these can be appealed to for official evidence of the original device of Arms, as they were issued without authority of law, the legislature declining to recognize the undertaking.

A lithographic picture of the Arms, obtained from a study of the three specimens first described, and conformed largely to the one from the military commission specimen, has been prepared by Mr. S. C. Hutchins and will be published as a vignette on the title page of the edition of the New York Civil List for 1880. The volume will contain from his pen many of the facts which I have mentioned. In the year 1875, a copy of the St. Paul's Chapel painting of the Arms was cut on wood with the legend, *Saint Nicholas Club*, 1875, as a design for the seal of that institution, and it may yet be adopted as such.

No peculiar significance or meaning has been attached hitherto to some of the emblems constituting the original Arms of the State; yet it is well worthy of our inquiry whether they had not a very distinct and positive meaning in the minds of the original proposers of them. If the interpretation of them which I shall venture to give shall be received as correct, I am confident it will enhance our respect and attachment for them. This significance disappears from most of the modern representations of the Arms; nor does any one of the three express all the meanings with equal force.

* Hickcox's American coinage, pp. 78, 79.—Historical Magazine, 1869, p. 117.

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I think the device upon the shield is emblematic of New York itself, by means of its most characteristic feature, the passage of the Hudson river through the mountains to the ocean; the tranquil and calm water represents not the sea but the Hudson river; there is land at the base of the shield, with shrubs upon it, which is the west bank of the river. The reason why the shield was made so broad at the bottom as compared with the very pointed base of the third specimen, was probably to give an opportunity to make the land on the west bank to be more obvious to the eye. The mountains represent those of the Highlands on the east bank. The water is not in commotion, dashing up against the base of the mountains, as drawn upon the great seal of 1777; for the mountains do not spring directly out of the water, but have a shore of foot hills of very slight elevation between them and the water. The existence of this low land on one and both sides of the water has never before been recognized on the shield in any of the later drawings until this moment.* Upon this river is to be seen, with a ship, the once so familiar North river sloop, passing through this wonderful chasm in the great Appalachian chain of mountains, which tells of the path for an empire assured thereby to New York, in the facility that this tidal communication, of one hundred and eighty miles from the ocean by the river toward the great lakes, and to the heart of the continent, was to offer for carrying on the commerce of the new United States.†

The eagle as the crest of New York has this historical prominence, that it is extremely probable that New York was the first of the States to make use of it. It now forms the crest of only Maryland and Pennsylvania of the original thirteen States. It was adopted by New York previous to its being adopted by Pennsylvania.‡ It was not on the colonial arms of Maryland, and in what year after the revolution it was first put upon the great seal of the State by the Council the evidence is not yet clear.§ The eagle was not adopted as a portion of

*The Rev. J. H. Frazee, of Franklin, Delaware county, who has in his possession the original engraved military commission of 1778, has at my request made an attentive scrutiny of it, and he informs me that there is unquestionably engraved upon the Arms, land on both sides of the water, such as I have described it.

† It is not a conclusion that I have adopted; but I have thought that when the original blazon of the Arms comes to be discovered, if it ever happen, it may be we shall find that the sun was designed to represent a "westering" sun, and not a rising sun; in which case the mountains depicted upon the shield would be those upon the west bank of the Hudson, and stand for the Catskills, which they fairly resemble, while they are more than twice as elevated as the mountains lower down the river.

‡ Penna. Legis. Docts., vol. III, 1875, No. 21.

§ Maryland, Laws of 1854.

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the Arms of the United States till June 20, 1782, more than four years after its adoption by the State of New York, as its crest.* It had not been upon any arms or seals previously used in the State.† There is reasonable ground for the conviction that the crest of New York, an eagle facing to the west, with wings spread, was the device of those who were familiar with the idea of western development, rendered popular by the prophetic verses of Bishop George Berkeley (of whom Pope said he had "every virtue under heaven"), at the time of his enthusiasm for education in America. They were written by him just half a century before the Revolution, and were entitled "The prospect of planting the Arts and Learning in America." He afterward passed more than two years (1729–1731), at Newport, in Rhode-Island. The device was intended to shadow forth, as in a picture, the concluding lines of those verses:

> "Westward the course of Empire takes its way;
> The four first acts already past,
> A fifth shall close the drama with the day;
> Time's noblest offspring is the last."

The eagle's head and front, and its flight are in the direction of the dexter of the shield, from east to west, from the old world to the new. The succeeding artist who painted the canvas for St. Paul's Chapel, aware we may suppose of the original intention of the design, and thinking that the emblem was not sufficiently understood, endeavors to make it more clear, by boldly painting upon the western continent of the demi-globe the word *America*, and draws the eagle, instead of standing upon the globe, as hovering over it in actual flight to the west.

Massachusetts in the midst of the revolution, in 1775, adopted the motto of her Arms from a couplet of Algernon Sydney. It would not be surprising that New York should have been inspired in a similar manner by such memorable verses from Bishop Berkeley. We know not what further revelations are yet in store for us from other sources regarding the early history of this ensign of our commonwealth. We know however that in 1776, Gov. Pownall had published in London his folio volume on the geography of the Colonies.‡ In this work he gives the greatest prominence to the position of New York, as constituting the line of division between all the other colonies, owing to the marvelous "chasm" as he calls it of the Hud-

* Preble, History of the Flag, Albany, 1874, p. 479.

† Lossing in Harper's Monthly, v. 13, p. 178.

‡ Pownall, T. A topographical description . . . of the middle Colonies of America. Lond., 1776, fo.

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son river, by means of which commerce easily reaches the lakes. And in the same year Adam Smith, discussing the possible future of the British empire, had applied by anticipation to the colonies the phrase "the seat of the empire."* With the writings of both these men, Washington must have been well acquainted; and hence when in 1784 in responding in New York city to an address of the Common Council, he applied to New York the phrase "your State (at present the Seat of the Empire)," he was adopting language expressive of a thought, already current in America for many years; a thought suggested first to the inventors of the Arms from the marvelous facts of nature, then from the writings of these English authors, and finally by them set forth to all men on the Arms themselves.†

The choice of Liberty and Justice as supporters of the shield, may have been suggested to our committee, from their remembering that in the Congress of 1776, on the tenth day of August these emblematic figures had been suggested as the supporters by the first committee appointed to devise Arms for the United States, a committee of the most distinguished character possible, John Adams, Thomas Jefferson and Benjamin Franklin, and only abandoned on account of the whole device as proposed for a seal with obverse and reverse, being too complicated. In brief, on the shield of our Arms is expressed not merely a sun rising upon the earth, but a sun rising upon the Hudson river, the great geographical feature of the State; while the crest is not merely a portion of a globe but represents America, and the eagle's flight expresses the hope of other poets and authors than Berkeley — the belief of tens of thousands of that day of the coming glories of the New World.‡

The Arms as we have now described them, continued to be set forth on seals and vignettes of books published by authority, without essential change, for a period of forty years. Engravings or woodcuts of them appeared on the title pages of the successive editions of the laws of the State, which were published by Greenleaf in 1798, by Webster and Skinner in 1801, by Southwick in 1813, and in the annual volumes of the session laws from 1815 to 1819; they all give us a passable idea of what was the original device. Gradually after

* Wealth of Nations, Book IV, Chap. 7, p. 59.

† New York City: Addresses to Washington and his Answers, 1775–89. N. Y., 1867.

‡ Rev. A. Burnaby in his travels in North America published in Lond., 1775, writes: "An idea, strange as it is visionary, has entered into the minds of the generality of mankind, that empire is traveling westward, and every one is looking forward with eager and impatient expectation to that destined moment when America is to give law to the rest of the world." p. 155.

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that date changes came on; at first one only of the figures or supporters appeared seated; but after a while both of the figures were drawn seated, or one of them disappears entirely; besides many other changes perhaps as serious, and without any apparent authority of law. To these changes we shall soon refer more particularly.

These changes originated in the substitution in these vignettes of the title pages of the session laws and of other publications of the State, of the pictures found upon the seals of the State in place of the pictures of the Arms of the State. The new dies for the seals formed a sufficiently graceful picture for a vignette. When the casts or blocks used in printing were worn out by use, the pictures on the dies of the new seals were allowed to take the place of the Arms. From time to time, as new cuts in wood or in metal were needed, the varying tastes of artists and engravers facilitated further changes, and occasioned still wider departures from the original Arms. The genuine Arms having once commenced to be disregarded as the unvarying symbols of the dignity and sovereign authority of the State, and not being in request except for occasional decoration and ornament, the pictures upon the seals were supposed to answer equally as well, and soon the time came when they were all that could be appealed to when any one was curious to see, or asked to obtain a representation of the State Arms.

Thenceforward seals, vignettes and pictures of all kinds, made of every sort of pattern for the public offices, have passed in the common estimation as tokens of the State Arms: they have been of every degree of completeness and exactness as regards the shield, crest and supporters. The only thing which is uniformly repeated upon every seal that I have observed except one, is the word *Excelsior*, which word with the ideal aspirations that it suggests, is certainly well retained, as conveying a double meaning of material and moral elevation.*

In the changes in these representations, whether regarded as Arms or seals, there are some which are especially worthy of notice, though we shall be obliged to omit all reference to many of them. In one of the devices, instead of the three mountains, the shield has the colors and stripes of the United States; another divides the shield between the emblems of New York and of the United States. In one there is the anachronism of introducing the canal as an emblem of New York; and in another a more violent anachronism, a steamboat and a railroad with a locomotive in the ornamentation outside the shield for Arms devised in 1778. The motto Excelsior is sometimes thrust within the shield. One of the latest devices for a seal for one of the public

*N. Y. Geneal. & Biog. Record, 1874, p. 55.

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offices has a picture of a castellated and barred entrance to a prison, and the only trace of the Arms of the State upon the seal is the inscription as if upon the doorstep, with a certain grim humor, of the motto, Excelsior! In many of the current pictures, each of the two supporters is on the opposite side of the shield to the one for which they were originally designed. Justice is seated upon some of them, and both Liberty and Justice are seated upon others. Liberty upon one has the cap of Liberty upon her head with the word "Liberty" upon the cap; upon another the cap has disappeared, both from the staff and from the head. Upon another Liberty is seated in a posture as if she were overcome with other spirit than the spirit of liberty. Upon a letter-head used in the Executive department as late as 1859 and perhaps later, there is the shield, the eagle and the motto, but the globe and the supporters have disappeared; and the legitimate symbols of Liberty and Justice have their places supplied by two figures symbolizing Science and Industry. The engraved letter-head in use in the office of the Trustees of the State Library has no unauthorized additions to the Arms, but rejects the crest and both of the supporters.

When by a movement of some one who has a fair knowledge of what are the Arms of the State, a picture of them, most of it correct, has been made, all that has been gained may be lost in the next picture drawn. Thus in 1849, the State struck a gold medal in honor of Lt.-Col. Bliss for gallantry in the Mexican war. The picture of the Arms on the reverse side was not only most attractive and graceful but in almost all respects was conformed to the original device. And yet five years later, on a gold medal struck by the State in honor of Lt. Hartstene's services in the Arctic regions, the design for the State Arms falls back upon all sorts of liberties and eccentricities, of which, recalling what I have said on the usual presence of it, the absence of the motto Excelsior is perhaps as noteworthy as any of them.

There is a change, much to be regretted, which has been introduced upon quite a number of the semblances for the State Arms, that the eyes of Justice are not blindfolded, the scales of justice, and the sword have been withdrawn from her hands, and in place of a sword is a roll of parchment. All these emblems belong to the original picture of the Justice of 1778, and constitute a part of the mythological emblems to signify that justice is an avenger of evil acting with impartiality. In another case, the avenging sword remains, but without the balance or covering to the eyes. And yet the statue of mere carved wood on the top of the cupola of the Old Capitol from 1806 until a late period, had been declaring, by the presence of the

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balance evenly suspended, and of the sword, what were the requisite symbols of her presence.

Although it is now more than three years since under the laws of 1875, the copy of the painting of the St. Paul's Chapel specimen of the Arms has been suspended in the State Library, yet the knowledge of the fact was not so widely diffused, but that the drawings which served for the State Arms as sculptured in stone over the fire-places in the Assembly Chamber of the New Capitol, have both of the supporters seated; the eyes of Justice are not blindfolded, the figures of Liberty and Justice are each on the wrong side of the shield; their feet are not clad with sandals; and the two ships and the crown are not there. There are other departures from the original, and yet the picture is much more complete than has been frequently given out for the correct Arms.

In respect of maintaining correctly the Arms of New York, the military department of the State has made more progress than the civil departments. The painting of the State Arms for the centennial of 1876 has apparently led to a change of the picture of the Arms of the State, as displayed in the center of the regimental flag of the N. Y. National Guard. In 1871 the Arms were painted on blue silk on regimental flags of twelve feet by ten, with the evident intention to have a complete arms, but both of the supporters were drawn sitting, and respectively on the wrong side of the shield. But in 1878 upon the new flag of white bunting, both of the supporters are drawn standing, as is proper, and Justice is blindfolded, with the balance and sword, as is also proper, though the point of the sword is turned downward and touches the ground. Upon the dexter or right half of the shield are to be found as on the original Arms, water (though without ships), mountains (four instead of three) and a rising sun. Upon the left half of the shield are quartered emblems of the United States; a measure doubtless justified on the ground that since the adoption of the Arms in 1778 the independent State of New York had formed a Union with the United States America; and conformed in that respect to the usages of heraldry (when done with authority). As the embroidery is worked through and through, the supporters appear on the reverse to be on the proper side of the shield.

I do not pretend to indicate or enlarge upon all the variations, between the original Arms and modern pictures of them; but there is one symbol which has disappeared from every representation of the State Arms that I have seen of the last ninety years. It is the overturned royal crown at the left foot of Liberty. I am not aware that

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the existence of this most significant emblem has ever before been pointed out or recognized as absolutely belonging to the State Arms.* It has disappeared from all the pictures of the State Arms, and from all the seals of the State, if it were ever upon any of the latter. And yet this crown is distinctly shown upon all the three early specimens of which we have been speaking. Now, while the arms of many of the States *symbolize* independence and liberty, our own State stands alone in declaring by this position of a crown at the foot of Liberty, a distinct abandonment of royal and monarchical government, and the substitution instead thereof, of government by the people and for the people.

By some accident in making the copy of the St. Paul's Chapel painting for the State Library, the crown has not been observed or preserved in the copy; nor was the sword and sceptre under the crown observed and copied. Or if observed, they may have been omitted on the ground that they were not an essential part of the Arms, according to canons of heraldry.

Without referring to the many arguments, which will naturally occur to your minds, against distorting and altering the emblems on the State Arms, I must instead beg you to dwell with me for a single moment on the argument against such changes which offers itself, from a consideration of the remarkable character of the three eminent men who proposed the device for the Arms in 1778. They were men who, we know from their history, had deliberately considered all the consequences that were involved for themselves and the people, in choosing the emblems which they set forth as a device of State Arms. Lewis Morris, John Jay and John Sloss Hobart: — the first a descendant of a commander under Cromwell and during the Commonwealth, and a signer of the declaration of Independence; the second a descendant of a French family seeking refuge here from monarchical persecution, the first chief justice of the United States, and six years a governor of the State; the third, a Son of Liberty of 1765, a judge of the Supreme Court of New York, a circuit judge of the United States, and a United States Senator. All three of them, prime leaders among their fellow citizens, at this very time were suffering from the devastation and wasting of their estates by the British, and were refugees from their homes.† The enemy was at their doors. They were familiar with the old seal of the province which down to the Revolution had upon the obverse side the Royal arms of Great Britain,

* Rev. Mr. Betts speaks as if it was introduced solely by a fancy of the artist who painted the St. Paul's Chapel specimen. N. Y. Geneal. Record. III, p. 18.

† Jones's Hist. of N. Y., 1879, vol. II, p. 48.

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and on the reverse the queen or the king of the successive reigns standing and receiving the homage of two crouching Indians, a chief and a woman, offering gifts.* The Arms of the colony, from the year 1686 had retained over the shield and supporters the sole symbol of the royal British crown as a crest. The laws of the colony in volumes printed in England or New York down to 1752 bore on the title page a vignette of the complete arms of Great Britain. But in 1752 and in 1762 the folio volume editions of these laws had as their sole vignette the Arms of the colony. The same seal only was on the colonial money of 1771. In thus superseding the complete British arms by the arms of the province, they were following on in harmony with those same popular impulses which had led the people to rush out from the King's Arms tavern, to overthrow the King's Statue on Bowling Green, and to cause its lead to be melted into bullets. No New York Arms had as yet replaced them in the Province. The sole change made in the old arms was to place the eagle over the shield instead of the British crown for a crest. They were required to provide a complete appropriate substitute, to make all things new. So these three men, rejecting with calmness all token of subjection, and standing upon the manhood of common citizenship, with no spirit of vengeance that with spear in hand exclaims, *sic semper tyrannis*, devise an emblematic State Arms, which announce with simplicity and directness a state to be maintained under popular sovereignty, and supported by Liberty and Justice without the aid of kingly power. The people of to-day, with a knowledge of the facts, will certainly not be indifferent when they reflect that a device of arms, originated and cherished by these leaders through such a crisis of our history, is liable to be either abandoned or disfigured, and no one can give a "reason why."

If it should be said in reference to one feature of the Arms, the overturned crown under the foot of Liberty, that according to heraldic rules it can be disregarded as not an essential feature, yet, remembering that it was placed there by men so honorable and honored in our history, should we not be jealous to retain it? We recall also that George Clinton, of whom Hammond says "he was in grain and principle a republican," in the same church where a preceding colonial governor had sat in his pew under a painting of the British Arms, had for many years, as Governor of the new independent State, sat under these new republican Arms, with the approval of all the people; and can we with easy and careless indifference allow our-

* The Arms previous to 1664 are described in the MS. folio volume Annalium Thesaurus, Secretary of State's office. They had no supporters. An impression of the seal having them may be found in Letters MS., 1647-1663.

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selves to erase or efface so expressive a portion of this grand and beautiful memorial of the birth of the State?

These Arms were conceived during the battle-year of 1777; they were formed at the crisis of the revolution. With these Arms on her flag, New York went through the war; they were displayed at the great surrender of Cornwallis at Yorktown. It cannot be possible that any of the emblems upon them, of such historical significance, will be allowed to disappear without any one knowing how it occurred and without any approving voice of the people. How can we speak of having no blot on our escutcheon, if we are indifferent as to what that escutcheon really is, and if we do not cherish the symbol of the empire State with reverence, when we find it restored to our sight?

When we consider the lofty and noble significance of the symbols devised by these founders of the State, how paltry and trifling are mere female figures, with the emblems of their character, the cap of liberty, the scales, the blindfold and the sword removed; figures seated and inactive, supporting nothing and apathetic, while our shield with its rising sun, and our motto, Excelsior, speaks of aspirations for all that is best, to be *sustained* by Liberty and Justice!

The badges and ensigns by which to designate and identify a people are a species of object-teaching, the use of which comes down from the remotest antiquity. The twelve tribes of Israel were each shadowed forth by a specific emblem. Each one of the six nations of the Iroquois was known by one. Our soldiers know what it is to follow or stand by the national flag in battle: and each army corps of our civil war had its unchangeable and easily recognizable badge.

In a comparative study of the arms and seals of the States of the whole Union, I find that at least sixteen of them have arms and seals which are nearly identical with each other, with the exception that each seal has the addition of an inscription or legend, bearing the name of the particular department using the arms as a seal. And in Massachusetts, as in New York, on parade or in service, the State flag having upon it the Arms of the State is borne along in company with the national colors. But the arms of several of the States appear to have been subjected to various fanciful changes like our own, as if in the view of those who make fresh copies, there was no significance or authority in the original picture or device. The arms on the seal of the State of Connecticut were changed before the revolution from fifteen vines to three with no apparent authority. The constitution of 1818 declares that the seal shall not be altered, but neither in that instrument nor in any law is the seal ascertained or described. In 1840, the Secretary of State was required to report whether any leg-

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islative enactment is required for a proper description of the seal, which he neglected to report upon.* In Wisconsin the State has no arms, *eo nomine*, established by law, except the device upon the great seal, which was devised by the Governor and Chief Justice in 1851 to replace the two former seals, and "Forward" adopted as the motto, as a free translation of the Excelsior of New York. And each department uses this as a coat of arms with such variations as the fancy of the engravers suggests.† In Pennsylvania, the knowledge of the correct arms and seal was found in 1874 to be lost, and a Commission including the Governor was appointed "to correct the arms of the commonwealth and to have the same recorded in the archives." This commission made a report in 1875 recommending a return to the earliest known copy of the Arms of the year 1779. In one of the documents accompanying the report it is recommended "that a stringent statute be adopted requiring adherence to the arms and prohibiting any tampering with them or so-called æsthetic improvement. . . ."‡

Whatever are the merits of the arms which have been adopted by any of the States, there are none of them which declare by so significant symbols, that the State has entered upon the maintenance of a republican and democratic form of government, as the Arms of the State of New York. The military commissions of the State begin, "The people of the State of New York . . . reposing special trust in you.....do appoint you"—that is, in the name of the people, instead of the language of a colonial commission, which was in the name of the Governor, and founded on *his* trust in the person to be appointed.

If this position which I have maintained, that this State has a definite and unchanged coat of arms for more than a century past, is verified, as on examination I think it will be, then it would seem that there cannot be a doubt what the decision will be, when the history and character of the arms are appreciated.

A common sentiment will be stimulated to secure the necessary action which shall prevent the Arms of the State from being confounded with the seals of the State; and measures will be adopted so that it shall no longer be true that any man in the State who is a voter may not easily know and be familiar with the symbols by which the State of New York a hundred years since decreed to make herself known to the world.

* Conn. Hist. Soc. Collections, vol. I, Art. by C. J. Hoadly.

† Wisconsin State Journal, Dec. 1879.

‡ Penna. Legislative Documents, 1875, No. 21, vol. III. p. 1113.

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It is obvious that the topic which we have been considering is deeply interesting to thousands in this State, and in other States also, from the enumeration which I have made of three recent calls for a public exhibition of our State Arms, two at Philadelphia and one at Mount Vernon; and from the fact that three times successively, in the years 1875, 1878 and 1879, the legislature has made appropriations of sums of money for correct drawings of the Arms, its members thus recognizing the importance of the subject. It is evident that the time has now come to give effect to these efforts, and that to prevent all whimsical or negligent treatment of the Arms in drawings by artists or others, which might either destroy or disfigure their significance, the legislature might wisely adopt measures to reëstablish by some declaration the character of the old arms of a century past, as not having been ever changed, if not as being unchangeable.

Among the measures necessary to be adopted one would be, to secure that a correct blazon or heraldic description of the Arms should be filed in the Secretary of State's office, and embodied in a special act, which should recite that the blazon which Gov. Clinton was directed to file cannot be found as the reason; and another that a steel plate should be ordered to be engraved and preserved, in the Secretary of State's office or in the State Library, conformed to this blazon.* And further to secure familiarity with the device, a painting of it on canvas should be suspended in the executive chamber, and copies of engravings made from the plate should be suspended in all the public offices of the Capitol, and sent for like publicity to all the county clerks. Copies should be furnished on application to cities and towns when applied for; and they might be accompanied with a printed certificate from the secretary that the engraving shows the true Arms of the State as preserved in his office.

It would be worthy of discussion also, whether it be not possible that the seals of the public offices, at least the great seal, as was originally intended, should ultimately bear these true Arms, each seal having its legend around the border, of the particular office or department using it. Questions relating to title to property may be made to depend upon the impression upon a document of a genuine, well-known and incontestable seal. Before the revolution, the royal arms were impressed upon the pendent seal used in patents and grants.†

*I am indebted to Mr. De Lancey for this last suggestion, made to me in writing since I read the paper to the Institute. He will also soon publish a paper containing his own more scientific statements on this subject.

†Addison on Contracts, Art. Seals, Am. Ed.

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The result of such measures and discussions would be to restore the Arms to the position which belongs to them. If in 1806, the Arms of the State had been carved and placed solely in the tympanum of the portico of the then New Capitol, as it was intended to have been done at the time when it was built, we would have been spared much of the confusion of the last seventy years. The Arms, besides being placed on seals, flags, military commissions, and medals of honor, might be placed upon all the public buildings, carved in stone or painted, not only on those of the State, but of counties, cities and towns; they should wave on a standard jointly with the flag of the United States over the Capitol during sessions of the legislature, and wherever it was natural and desirable to impress a sense of the presence of the sovereignty of the State and of its eminent jurisdiction. Every citizen and beholder would be inspired thereby with sentiments of respect and of patriotic pride in the Empire State.

NOTE. — On page 266 the Arms, usually called the Arms of the city of New York, are referred to as the Arms of the Colony or Province. The same Arms are indeed those which are stamped both upon the paper currency of the Colony and upon the editions of the laws of the Colony for more than a score of years previous to the Revolution. But the change of name from "city" to "colony" was made in the text while the essay was passing through the press without comparing it with the context. It would be, however, an investigation of much interest if some gentleman would find time to make it, to discover and trace the history of the origin and varied uses of the Arms of the *Civitas* of New York from their first introduction to the present time.

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THE CORRECT ARMS OF THE STATE OF NEW YORK.

SECOND PAPER.

By HENRY A. HOMES, LL. D.

[Read before the Albany Institute, May 24, 1881.]

I should not presume to address you a second time regarding the State Arms, if I did not hope that I had some thoughts to present to you, which were both new and true and worthy of your consideration. I have some important additions to make to the statements on the subject, which I made in this place eighteen months since, and of such a nature that in listening to them, I hope they will explain and justify to your minds my willingness and desire to bring them under your notice.

I am not an enthusiast for this one idea of a correct Arms for the State; but I have a strong persuasion that the restoration of the true insignia of this great State to their proper place is an object worth accomplishing, and that it will not be accomplished without steady exertion to that end, and that when completed it is desirable there should be a prevailing sentiment that it is well that it has been done, and that the immense majority should be satisfied with the result obtained. Yet I believe that there never will exist that prevailing sentiment that it has been well done, if the matter is abandoned to the taste and arbitration of any one man to decide alone on what is the true representation of our original Arms.

Before calling your attention directly to my topic, I desire to be indulged in a few preliminary remarks, on the relations which the science of heraldry holds to the insignia or Arms of our American States. The occasion for making them is that during the year I have met with persons who were ready to decide questions regarding the Arms of this State, by the rigorous application of the laws of heraldry; while the making this rigorous application would entail results to which in my opinion New York ought not to assent.

The relations of heraldry to our State Arms will be better apprehended after I shall have read a short extract from T. C. Banks' preface to a fresh edition of the work of the great antiquarian Dugdale, on the ancient usage of Arms.

"The original design of heraldry was to discriminate persons and families, and to illustrate the histories of nations in general; to represent the martial deeds of our ancestors, to perpetuate their mem-

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ory, to trace the origin of noble and ancient houses, to distinguish the many branches descending from the same stock; to show the several degrees of relationship in which one family stands to another, and to ascertain by the blazonry of the proper coat, how each is descended, or connected by marriage or alliance."*

The main object of heraldry differs greatly from the object of State emblems or Arms. Heraldry is for coat armor, to distinguish individuals; other devices are for the purpose of distinguishing societies and States.

The great object of heraldry has been, by means of officers *ad hoc*, to control the entrance of persons into the ranks of the nobility, and to trace by means of marks, upon armor, banners and the like, relationship of individuals. It extended to monarchies in Europe, because the kings themselves had their own coat armor.

In our American States we have no family history to recognize by coats of Arms. We call the device which we create, to be the symbol of a State, the Arms of the State, for the convenience of using a word derived from heraldry, because readily understood in its application, descended as we are from the western people of Europe; to some extent we use the terms of heraldry as furnishing words by which we can render intelligible our ideas; and on account of their agreeable associations, we also preserve the outward forms of a science or art five hundred years old, such as the shield, crest and supporters. And in many of our States if as a matter of taste there had been greater conformity to the principles of heraldry, the impression on the minds of the people who acknowledge those Arms would have been more elevating.

Still our State Arms do not perpetuate the history of the rights or rank of individuals, or of conquered States. They are a symbol established by law, of which one part is as essential as the other. If in heraldry the shield alone is the Arms, and the rest may be pronounced ornamentation, whether ornamentation by authority, or without authority, the same cannot be said of the Arms of the American States. It is the whole device which constitutes their Arms. It is to such insignia we may apply the language used in the treatise published in 1592, by Sir William Wyrley.

"Without such tokens.....nor so much as any commonwealth whatsoever can be defended, neither from outward enemies, civil discord, or the rebellion of any plebeian rout." †

The Arms of all States, those of Europe and Asia, are not mere coat armor: they are insignia which are regarded by their people as one

*Banks' Dugdale, Lond., 1811, fo.

†Quoted in Dugdale's Ancient Usage of Arms, 1682.

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whole, by which they are recognized among men, one portion of the token being as much a part of the whole as any other portion. The stalwarts that support the Arms of Prussia, and the lion and unicorn that support the Arms of Great Britain, are more essential to make an impression on the popular mind that they have before them the symbols of their country for their patriotic reverence, than any of the minute quarterings within the shield.

Approaching closer to details regarding the New York Arms, I have still one observation of a general nature to make regarding them; it is that New York is one of the very few States that makes any mention at all of Arms in its constitution or laws. I regard this fact as worthy of being made prominent, if for no other reason than because it affords an evidence of the high culture of the leading minds in the convention. In the history of the successive States of the Union, the urgent motive for establishing Arms for each State has chiefly been to be in possession of a device for the *seals* of the State. Indeed the laws of the States, as if mindless and regardless of Arms, frequently merely require that there shall be a device for a seal, and this seal subsequently becomes in the usage of all the Arms of the State, although the laws nowhere make any mention that that State has any Arms.

On the first organization of a State or Territory, the officers of its departments and courts solicit of the legislature the means of legalizing their acts by a seal, and it immediately authorizes its chief officer or officers to devise such a seal. Availing themselves of such resources of wit, fancy and education as are at hand, a device is precipitated upon a State by the officers of that year for a seal, and it is this seal, which, perhaps without the approval of the best minds in the State, stands through the successive years, not only as the State Seal, but also as the State Arms, and is used upon the State flags, and upon medals. Yet in the popular apprehension the device is less known as being the State Seal than as being the State Arms.

The language of the original motion in the New York convention on this subject, in 1777, confirms the general truth of what I have stated. The first motion made was solely to appoint a committee to devise a great seal. The action some months later, in September, appointing a second committee, specified nothing farther than a seal. But when in March, 1778, the law for the seal came to be enacted, its language was, "and whereas Arms complete have been provided and seals." Although there had been no requisition for Arms from the committee, there were evidently some persons near the government who recognized the genuine necessities of the case for the rising State,

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and were influential enough to secure for the distinctive word Arms a place in the law.

I will now proceed to present in order the work that has been done, and the additions made to our stock of knowledge regarding the State Arms, or other important observations, since the reading of my paper in December 2, 1879, before the Institute.

1. At the time when that paper was read, no other copy of the military commission of 1778 was known to be in existence than the one of Lieutenant Mortine. During the past year, however, upon untying files of papers in the office of the Secretary of State, a considerable number of similar military commissions, perfect in every particular, have been discovered. Other copies have been given to the State Library by citizens of the State, and are also known to be in the possession of individuals, thus establishing clearly the fact, which had been doubted by some persons, that this engraved military commission was in common use. One of these commissions, given to the State Library by a descendant, is that of Kilian Van Rensselaer, as colonel of the Albany county regiment in 1778.

2. It is one of the discoveries of the past year, that the use of this vignette of the initial letter T was not limited to the military department, but was also used on civil commissions. Among the papers on file in the office of the Secretary of State, there is an engraved heading of a civil commission with the Arms identical with the heading of the military commission, printed upon parchment, and recorded August 19, 1778, as a commission to Gen. Philip Schuyler, to be a delegate from New York to the Continental Congress, thus establishing the fact that this was also the drawing of the Arms adopted for use in the civil service of the government. A difference of opinion existed at the time in the convention regarding the nomination and appointment of delegates by the Governor; and Gen. Schuyler was not actually chosen a delegate until the 25th or 26th of September, at Poughkeepsie.

It is natural to ask the question, why this engraved form of the commissions did not continue in use? The answer is that it was not essential that the Arms should be found in the initial letter; it was the privy seal of the Governor which stamped the commissions with authority. It is probable that in transferring the seat of government from Kingston to Poughkeepsie, the plate was mislaid and lost. It may have been purposely abstracted by the engraver, of whom a sketch was lately published in the Magazine of American History very little to his credit. It disappeared during the year of confusion of the revolutionary war, resulting from the battle year of 1777 in the State of New York.

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My reason for dwelling upon the large number of these commissions which have been found, and upon the fact that the same heading was also used for civil commissions is this, that so long as there was only a single copy known, it gave some color to the assertion of some that this initial T was a fancy sketch of the engraver, and was of little significance as a witness as to what were the original Arms. Now, however, that the extensive use of it by the Governor has been established, and that no other contemporaneous witness has arisen to detract from its authority, the military commission acquires great value as evidence.

3. On account of the feeling which I had that every person interested in the subject of the true Arms ought to have the means of judging for himself by comparison of the various early specimens of them, a beautiful copy in oil colors of the St. Paul's Chapel painting has been made at the personal expense of the State commissioners, at my request, for the State Library. It was painted by the same lady who painted the N. Y. Regimental flag of 1779 for the library. And there any person can now compare the three earliest known specimens of the Arms with each other. And remembering that the Arms which were drawn under the law of 1875 were drawn only from this picture of 1785, or pictures of later date, without the use of the military commission and the regimental flag pictures, we must conclude that it would be improper to have the question of what are the true Arms foreclosed, and shut up from discussion by any action taken under that law.

4. In the paper of 1879, I mentioned the existence of additional early examples of the State Arms, current in 1787, upon copper cents. For the same year, though ten years later than the law of 1778, we can now refer to an edition of the session laws, having on the title page a vignette of the Arms. They were also painted about the same time though very imperfectly upon tea-cups made in China, a specimen of one of which I am enabled to show you this evening. A drawing of the Arms was upon the cover of the first volume of the New York Magazine of 1790, and on the title page of the printed volume of the Journal of the legislature for 1792. None of these specimens adhere to the earlier examples with more than a rude faithfulness in most particulars.

5. In the first paper, I spoke correctly of the appointment of Jay, Morris and Hobart to prepare a seal for the State. It appears, however, that in the confusion of the times the seal was not forthcoming. The men first appointed had not been able to perfect their undertak-

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ing, while the necessities of the State for a seal continued. Accordingly on September 10 of the same year, Gov. Clinton and Chancellor Livingston were appointed to attend to the same duty and to order a seal to be made. I am indebted for the reference to the Journal of the convention for this fact to Mr. Edward F. De Lancey of New York. It was voted that in the mean time the seal of the Governor be the great seal of the State. This is the seal which is called in section 1 of the law of 1778, the Governor's "seal at Arms," that is, his seal with his family Arms upon it, such as each one of the colonial governors had been in the habit of using. It appears from the Journal of the convention, December 31, 1777, that the seal was actually finished, and adopted in that year, and on that day. And it was this seal which served as a basis for the "Arms complete" mentioned, and adopted in the law of March 16, 1778. There is no record so far as is known what was the measure of coöperation of any one of these five men, in producing the device of Arms as we this day find it, with which their honored names will be forever associated. Instead therefore of three, as I reported in 1879, we have five of the most eminent men of the State, associated in this measure of revolution and republican independence, a measure which was sanctioned by all who constituted the provincial congress of the day.

6. In my first paper on the Arms, I argued that the water between mountains, and a meadow at the base on the military commission, indicated a river, not the sea, and that river the Hudson river, with vessels of commerce upon it. But it will be remembered that on the paintings of the regimental flag, and of St. Paul's Chapel, the water extends to the very base of the shield, and those paintings do not represent the meadow; hence if, in the reconstructed Arms of the State, nothing was to be retained which did not have the testimony in its favor of two of these three witnesses, the meadow or fringe of land would have to disappear as being merely an invention of the engraver, and without authority.

Now it is one of the results of the investigations of the last year, that it is clearly established from the examination of many specimens of impressions upon wax of the great seal of the State, and attached to deeds and other papers from 1777 to 1798, that they have this fringe of meadow-land at the base of the shield. This fact conclusively shows, that the great seal which was the original, and prototype of the shield of the complete Arms of the State, was closely imitated by the engraver of the military commission.

The seal having been made under the authority of a resolution of the convention of September 10, 1777, we have in it a second and

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most authoritative witness to the existence of the land on the Arms at the base of the shield. Engravers, who in the past years have assumed to make *fac similes* of the seal of 1778, have overlooked this none the less conspicuous and highly important portion of the picture which they were copying. The seal of 1777, though it did not pretend to include the Arms complete, yet contained the full sun, the mountains, the river, and the land at the base. The date on the seal of 1777 represents both the year of the organization of the State government, and the year of adopting the seal. The seal on this particular point is an earlier witness than any one of the three specimens we have employed.

7. In the paper of 1879, the opinion was expressed by me, that the State of New York was the first of all the States, and preceded the United States, in placing the eagle on the insignia of the State. The only State in reference to which there remained any doubt at that time was Maryland. It now appears that Maryland never had the eagle on its arms until 1840; and on this point I will read an extract from a letter addressed to me by Mr. W. H. Browne, the librarian of the Johns Hopkins University of Baltimore, during the last year, October 28, 1880.

....." The legislature, some twenty-five or thirty years ago, swept away the cap and crest, and put in their place an unmeaning eagle, which remained until about 1873 or 1874, when the ancient device was restored. I have little doubt that you are right in your supposition, that New York was first to adopt the eagle. It has no place in the genuine Arms of Maryland, and its appropriation by New York should have been an additional reason why our legislature should have let it alone."

8. In the paper of 1879, I suggested that it would be proper that the seals of all the department offices, and of the courts, should be conformed to the State Arms, and have a legend around the Arms, to contain the name of the department or court using the seal. A custom has grown up, which has the sanction of law in many cases, that the departments do not use the Arms of the State on their seals; instead thereof in many of the public offices at the capitol, the devices engraved on their seals, letter-heads and envelopes retain either no part of the Arms of the State, or only the motto Excelsior, and some of them do not retain even that; and the device on the seal of each department and public office differs from that of almost every other department.

The State of New York has in this matter countenanced a usage which has not its parallel to the same extent in any of the States of the Union, and has allowed herself to be misrepresented in her State symbol more than any of the States of the Union have been as re-

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gards their own. These devices, when found attached to documents issued by these departments, do not suggest to any one familiar with any of the representations of the Arms of the State, either with the correct ones or the altered ones, that the document is issued by authority of the State of New York, except by the legend containing the name of the office or department surrounding the device.

In contrast with this usage, at least sixteen of the States, and probably many more of them have Arms and seals, whereof the devices for the one and the other are identical, except that each seal bears, as an addition to the Arms, the name of the department employing the seal.

The State commissioners have received letters from the secretaries of State of Connecticut, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, Pennsylvania, Rhode Island and Vermont, in answer to communications addressed to them regarding their own usages in this respect. The responses in many cases brought full sets of all the devices in use as Arms or seals, or on letter-heads, making quite a voluminous collection.

So far as we have observed, these engraved State insignia are invariably composed of a center, containing the State Arms, accompanied with words containing the name of the State, and of the particular department using them, either over, under or around the picture. Of late years the laws of some of the States which have suffered by painful experiences from the abuses flowing from the absence of clear laws regarding the Arms and seals, specifically require that the Arms of the State shall be the device to be engraved upon all the seals of the State.

For the first example, I will name the State of Arkansas, which enacted, as late as 1864, a law, one section of which reads as follows:

"All official seals used in this State shall present the impressions, emblems and devices presented by the great seal of the State, except the surrounding words which shall be such as to indicate to which office they may severally belong." *

A law of Ohio, which was passed May 9, 1868, and which was enacted from the same motives, in the first section describes the device of the "Arms." In the second section it is provided that the great seal shall have the same device described in the preceding section. The same section proceeds then to name all the courts of the State, and the departments, giving the legend to be engraved on the seal of each one, and closes in these words: "All the seals ..... shall contain the words and devices mentioned in this act, and no other." †

In addition to these two States, other States suffering from abuses

*Arkansas, laws of 1864, May 3.

† Ohio, laws of 1868, Rev. Statutes, 1880.

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in the alteration, without authority, of their Arms, have been obliged to re-establish their legitimate Arms by fresh legislation. Such States are Connecticut, Maryland, Pennsylvania, Rhode Island and Vermont. New York may be the last to apply the remedy, but the facts mentioned in the first paper, of very numerous alterations of the New York Arms, we think sufficiently demonstrate the necessity of some action by the State to recover herself from these irregularities and inconsistencies, and to render such departures from and disregard of the genuine Arms of the State impossible ; and that our laws should require a similar uniformity in the use of the State Arms on the seals of the public offices of the capitol, and of the courts. It is not an exhibition of suitable respect to the State, that each of its departments should symbolize or represent itself by a distinct and different device, and ignore and omit to employ the very device by which the State has chosen to set forth its sovereignty. The dignity of each department and bureau, and of the courts is derived from the State, and no one of them can devise any emblem for use which can surpass, in value and significance, that of the State which they represent.

9. One of the objects of my paper in 1879 was to call attention to the numerous incorrect representations in use of the New York Arms. With the same design, a letter was addressed to me from Washington, stating that the sculptured representation of them upon the block of marble, which had been contributed by the State in 1851, to the national Washington monument, to be placed in it with similar blocks from other States, did not contain a true picture of the State Arms, according to any one of the three early examples of them. I secured a faithful copy of the design upon the stone, and in February I visited the lapidarium containing the collection for the monument of sculptured blocks of stone, representing the Arms of thirty-one of the States of the Union. The State commissioners on the Arms, finding that the divergence from the original Arms was great, addressed the president of the association, who is the president of the United States, requesting delay in placing the stone in the monument, until the wish of the State upon the subject should be expressed. There can be no doubt but that the carving must be effaced from this block, and a correct copy of the Arms substituted in its place. This is the recommendation of the commissioners.

10. In my first paper, among the many improper alterations of the Arms adverted to were those affecting the supporters — Liberty and Justice. No one of the original thirteen States adopted for their Arms supporters so suggestive of lofty principle and purpose as the

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State of New York; indeed the Arms of most of them have no supporters. Although Virginia has a Liberty, it is not as a supporter, but fills the shield as an avenger of Tyranny. New Jersey has Ceres with Liberty as supporters, but the other ten States have nothing of the one kind or the other suggestive of virtues or duties. Whence arose the eminent distinction of New York in this feature of her Arms? In the first paper I spoke of the three men on the committee, Jay, Morris and Hobart, as having been judges on the bench. We have now to add to their number a fourth, also a judge, Chancellor Livingston, and a fifth, George Clinton, a member of the bar, and the first governor of the State, and for a longer period than any of his successors. In the absence as yet of detailed written records containing the history of the origin of our Arms, it is but reasonable to give due credit to these four dispensers of justice, as having been led both by their education, profession and character to exhibit the virtue of Justice as one of the pillars of the State along with Liberty.

It should serve to enhance the respect with which the Arms of the State should ever be regarded by us, to dwell upon the character of these men, thus eminent in position, with whose names we must hereafter always and unavoidably associate this device. Of Clinton and Livingston, the two new members of the commission, I do not need to say a word more than that they two are the citizens whose statues have been selected by New York State to adorn the national Walhalla at Washington. But it is worth adding that four of the five men on these committees were graduates of American colleges. Jay graduated from Columbia in 1764; Morris from Yale in 1746; Hobart from Yale in 1757, and Livingston from Columbia in 1765. It is not a fact that should surprise us that the influences of a liberal culture should appear in the determinations of such men regarding the symbols of the new State, even if they did not personally originate them.

It is worth remembering, as will appear in the sequel of this paper, that the acted drama had been introduced into New York in 1753, and the plays of Shakespeare were repeated on the boards of the theater there. The members of the committees were men of as high culture as any to be found in the thirteen colonies. This fact with their personal history gives us the assurance that they were either thoroughly competent themselves to devise Arms for the State, with the symbolical perfection and heraldic completeness which we find in our Arms to day, or to influence and approve of the adoption of such rich insignia if prepared for them by another person, under their direction.

Regarding the emblematic figure of Liberty, I would observe that

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the color of the Liberty cap upon the pole in her hand, is not red, upon any one of the three early specimens of the Arms. The cap has been designated by some as a Phrygian cap, the color of which is historically represented as red. Our Arms were devised however long before the French revolution of 1793; and even if the color of the cap had been red, there was nothing in the principles of a government for the people which New York was devising, to suggest a destructive spirit, or any symbol of a like spirit.

The emblem of Justice on our Arms does not represent Themis or jurisprudence, into which it has been changed on the letter-heads in most frequent use in the departments at Albany, but represents as near as may be the Greek goddess Astræa. It was from this figure of the goddess, as a beautiful virgin, was derived also the Justice which originally formed the seal of the Supreme Court of the State of New York down to the year 1846. With the change resulting from the new organization of the court, by which the seal of the county where the court is held is impressed upon such documents as require a seal, that seal is no longer in use.

A learned member of the bar has kindly suggested to me that it is worthy of mention that the symbol of Justice as here presented, harmonizes both with the Bible and with Shakespeare — with the Bible as in Job, "let him weigh me in the balance of justice," and with Shakespeare who speaks of the "sword of justice," and of learning to "poise the course of justice in equal scales, whose beam stands sure, whose rightful cause prevails." Henry IV also is made to address the Lord Chief Justice thus:

"Therefore still bear the balance and the sword.... the unstained sword that you have used to bear."*

Why should such symbols of the god-like principles of single mindedness, impartiality and retribution be allowed to disappear from the figure of Justice, and from our Arms? I will add but one word more in this connection, which will be excused as appropriate to my argument for maintaining the figure of Justice as one of the supporters of our Arms. On the last evening which I passed with the late lamented Chief Justice Church a few weeks before his decease he three times successively introduced before a numerous company the topic of the State Arms, and urged me to endeavor to secure the appointment of a commission to re-establish New York's ancient Arms.

11. The last point which is of the nature of new light upon the Arms, and to which I desire to invite your attention is the results of

* 2 Henry IV, 5; 2.

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an inquiry, as to the probable reason for introducing a sun into the shield of the Arms. I think that its introduction was first suggested by the fact that a full sun was the badge or cognizance of Edward, Duke of York, who was afterward Edward IV, and was regarded by him as an omen of prosperity and success.

If you do not, after listening to the reasons which I have to offer for the suggestion, find them satisfactory, I shall have to take the responsibility of this application of the alleged facts; I am not aware that they have previously been thus applied. The history of the adoption of the sun as the badge of Edward IV is related in five or six of the early chronicles of England, the fullest accounts being in those of Hall and Holinshed. The event took place toward the close of the wars between the white and red roses, between the houses of York and Lancaster, and resulted in establishing the dynasty in the line of the family of York. A very successful and decisive battle was fought by Edward in the edge of Wales, February 2, 1461, called the "battle of Mortimer's Cross." I will only quote Holinshed's account of the battle, and of the prodigy which accompanied it:

"But when he was setting forward, news was brought to him, that Jasper, Earl of Pembroke, half brother to King Henrie, and James Butler, Earl of Ormonde and Wiltshire, had assembled a great number of Welsh and Irish people to take him; he herewith quickened, retired back, and met with his enemies on a fair plain near to Mortimer's Cross, not far from Hereford East, on Candlemas Daie in the morning. At which time the sunne (as some write) appeared to the Earl of March like three suns, and suddenly joined altogether in one. Upon which sight he took such courage, that he, fiercely setting on his enemies, put them to flight; and for this cause men imagined that he gave the sun in his fulle brightnesse, for his badge or cognizance."*

Wm. Habington published the life of Edward IV in 1640, 180 years after the battle of 1461, at the express desire of Charles I, who had been Duke of York; only two Dukes of York had intervened between his possession of the title and Edward IV, 140 years previously. He discusses this phenomenon of the sun in the following language: "Before the fight, the sun (as by many authors it is asserted,) appeared to the earl in the resemblance of three suns, and suddenly united in one. The truth of which I will not dispute.... Yet how this omen could be expounded happy to his designs I understand not, unless we seek the interpretation from the event; for that indeed gave him the victory, and brought the glory of the two adverse generals (Pembroke and Ormonde) to his side; so that the three suns

* I, 660, Lond. 1587.

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which with equal brightness appeared in the morning, before evening shined alone in him. For the two earls and their whole army were put to flight with the slaughter of 3,800 men on the place." (Kennett's England, 1706.)

It was this phenomenon, which was probably a genuine mirage, and which was so well accredited in the minds of the people, which led Edward IV to adopt a sun in splendor as his badge. It was placed upon the housings of the saddles, and upon his banners. The gold coin of his reign called the rose noble, and the rial and half rial had the sun stamped upon them. I do not find that the sun had previously to this been stamped upon any of the coins of the realm of England. It was also used during his reign, and only in his reign as a mint mark. Writers on the history of the coins of England, Fleetwood, Leake, Ruding and Akerman, agree in ascribing this origin to the sun upon the gold noble. If the sun was not uniformly perpetuated afterward upon the Arms of the kings, or on the coins of the kingdom, the explanation is found in the words of Dallaway in his Heraldry: "A cognizance is but temporary in a family; it does not descend like the Arms, and so it never became a perpetual badge of the succeeding members of the dynasty of England." And for the same reason, Guillim does not give the sun in his drawing of the Arms of the Dukes of York.

After the golden coin of Edward IV, the first coin upon which we find the sun, was one of the reign of Mary, and next upon the gold coin of Elizabeth. James I had it placed upon the sovereign. In all these cases it was upon the reverse of the coin, and the suns were all of the same type. We will speak later of the use of the sun by James II.

It was of this sun of the Duke of York that the members of the committee of the New York convention on the arms would have been reminded when they dwelt upon passages relating to it which Shakespeare has woven into two of his historical plays. I will here quote a portion of the scene from the third part of Henry VI, between Edward who became king, and Richard the second Duke of York. In the margin we read: "A plain near Mortimer's Cross in Herefordshire."

The Duke Richard addresses Edward:

> *Richard.*—See how the morning opes her golden gates,
> And takes her farewell of the glorious sun;
> How well resembles it the prime of youth,
> Trimmed like a younker prancing to his love!
>
> *Edward.*—Dazzle mine eyes, or do I see three suns?

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Richard.—Three glorious suns, each one a perfect sun;
Not separated with the racking clouds,
But severed in a pale clear-shining sky.
See! see! they join, embrace and seem to kiss,
As if they vowed some league inviolable.
Now are they but one lamp, one light, one sun:
In this the heavens prefigure some event.

Edward.—'Tis wondrous strange, the like yet never heard of.
I think it cites us, brother, to the field,
That we the sons of brave Plantagenet,
Each one already blazing by our meeds,
Should, notwithstanding, join our lights together,
And overshine the earth, as this the world.

A few years later in English history, Shakespeare makes Richard III, then Duke of Gloster, break out in triumphant soliloquy, in the first words of the play with that title:

Gloster.—Now is the winter of our discontent
Made glorious summer by this sun of York;
And all the clouds, that lower'd upon our house,
In the deep bosom of the ocean buried.

I will quote no more of this soliloquy than the allusion to the badge of the new king, Edward IV.

But it will be inquired why, readily granting that our New York legislators were familiar with Shakespeare, and familiar with this Yorkist legend, why it should in consequence be surmised that they designed to put into the shield of our Arms a Yorkist sun? I will not attempt to discuss the question asked at length. But in the first place I must say that negatively I regard the adoption of a sun, full like this one, as the adoption of so uncommon an emblem that I cannot help inferring that the New York convention had some extraordinary reason for adopting it. The story of the three suns becoming one, unconnected with any subsequent history, we easily and naturally let pass as an idle legend. But when we find that monuments were established in memory of the alleged occurrence, it acquires a new importance and has taken its place in history. Affirmatively, I think that this historic Yorkist sun may be claimed to be the sun in the arms of New York for a first reason, that it is more like a Yorkist sun than any I have ever seen. On the coin or rose noble of Edward IV, it is a full sun; on the seal of the State of New York of 1777, it shows more than eleven-twelfths of the sun—all that it was possible to introduce compatible with the introduction of the other objects in the shield. A sun is an uncommon emblem in any arms as compared

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with the numerousness of other emblems. Among states and nations of previous date, I only find it used by Persia. It is also on the patriotic banner of Ireland, called Fingal's and is named the "sunburst," having been upon the standard of her hero Bryan Boroihme, when he won the decisive victory against the Danes, in the year 1014, at Clontarf.

On the St. Paul's Chapel picture of the New York Arms, we find less than half the body of the sun is represented, but that is the latest and least valuable witness of our three only specimens of the Arms. It is on the wax seal of New York of 1777 that the large proportion of the sun which is exposed shows most conspicuously.

My second reason for thinking that it is not a mere coincidence that the sun of the New York Arms resembles the sun of the York family is the following: James II, formerly Duke of York, when he had been on the throne for two years, on account of complaints from Governor Dongan, in 1685, of irregularities in the use of seals in the province of New York, sent over the sea, by special command, on August 14, 1687, a new seal, with a sun upon it, which was to be used in the place of all other seals. It reached New York, November 19, while Governor Dongan was in Albany. It is thus described by the king's minister, the Earl of Sunderland, in the document containing the warrant for its use in the province: "The obverse has on the one side the effigies of the king on horseback in arms, over a landskip of land and sea, with a rising sun." It will be asked if this was a Yorkist sun? Unfortunately it is not known that there is a copy of this seal in existence. The secretary calls it a rising sun, but it could not well have been less than a Yorkist sun, for that too was a rising sun according to the legend, though all above the horizon.

James the Second had been at his birth declared Duke of York, by Charles I, and ten years after he received the patent of Duke of York; he had read Habington's history of Edward IV; he was learned and a pedant; he had been declared proprietor of New York in 1664.

He gives to it in the place of its old name of New Netherland, the name of its new proprietor. Although the sun had ceased to be used upon the coin of the kingdom for many years, he revives the use of it by placing it upon the new seal of his province, named after him. Can any other supposition be fairly made than that while he did not place there the insignia or arms of his own family, yet that he placed there as emblematic of the name of New York, the cognizance of the family of York?

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The mind of James II was full of the thought of perpetuating the name of his family title in the new world, and in his proprietary province. He, being Duke of York and Albany, calls the chief city as well as the province by the same name of New York instead of New Amsterdam or New Netherland. Fort Orange becomes Albany, Long Island is called Yorkshire, and the region of the Shawangunk Mountains, receives the name of Albania.

It is very likely that no document exists anywhere with this seal attached to it; the seal itself was broken up in public and no impression of it is known to exist. But it is very easy to account for this fact. In less than a year from the date of its reception, in August, 1688, Governor-General Andros defaced this "almost virgin seal" by the order of James II, and its place was supplied by the seal of the *new* "New England," (which name was made to cover all the British possessions north of latitude 40°) and of which he had been made governor-general. With the English revolution of 1688, the next year, all chance of again using the York seal of the sun as an emblem of New York, ceased with the expulsion of James II, and the commencement of the reign of William of Orange, or it might have remained in use on coins and on our seal until 1776.

An impression of this seal of New England, which was the only seal in use in New York, from August, 1688, to April, 1689, it may not be inappropriate to observe here, should be included in the collection of the seals of the State in the New York Civil List. No copy of the impression was known to exist at the time of publishing the Documentary History of the State, in 1850–51. One was presented to the New York Historical Society in 1862, being attached to the patent creating Joseph Dudley, first chief justice of New York. (*Adlard's Sutton-Dudleys of England*, Bost., 1862.) It should be brought into its proper relations with the seals of the State, as one of the series, in use for a period of seven months.

The seal has one peculiar additional item of interest, in that it is the first of that series of seals of the State which continued to be in use through a period of eighty-eight years, from the year 1688 to the year 1776, having on one side an Indian kneeling before the figure of the sovereign of the day, king or queen, and offering gifts. This first seal differs from all the remainder of the series in having the figure of an Englishman, as colonist, teacher or missionary, kneeling by the side of the Indian. If the figure is that of a teacher, it may explain the selection of the motto from Claudian which is on the seal.

I have given reasons for believing that the members of the committee of the convention must have been well acquainted with the

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Yorkist badge from history and Shakespeare. I might add that the notices of this badge of the sun are frequent in English literature. I have before me extracts from Drayton's poems, from his Polyolbion and from his Miseries of Queen Margaret, repeating the story of the three suns. Drayton was a contemporary of Shakespeare. In the 22d song of the Polyolbion he distinctly affirms what was the phenomenon which induced Edward IV to choose the sun for his badge.

"When to the Duke of York (his spirits as to awake),
Three suns at once appear'd, all severally that shown,
Which in a little space were joined all in one,
Auspicious to the Duke, as after it fell out.

* * * * * * * * * *

When this most warlike Duke in honor of that sign,
Which of his good success so rightly did divine,
And thankful to high heaven, which of his cause had care,
Three suns for his device still in his ensign bare." *

It may be a convenience to subjoin the extract from the second of the poems mentioned.

"Until at length (as Fortune pleased to guide),
The conquest turn'd upon the Yorkists side.

* * * * * * * * * *

Three suns were seen that instant to appear,
Which soon again shut up themselves
Ready to buckle as the armies were,
Which this brave Duke took to himself alone,
His drooping hopes which somewhat seem'd to cheer;
By his mishaps near lately overthrown;
So that thereby encouraging his men,
Once more he sets the white rose up again." †

Later references to the prodigy of the sun may be mentioned, as that of Hume, who refers the defeat of the Earl of Warwick by Edward IV, to an accident which led the Lancastrians to mistake the star of the Earl of Oxford for the king's badge of the sun, and to drive a portion of their own forces from the field. Bulwer-Lytton, in his novel "The Last of the Barons," referring to the event, says: "The housings of his steed were spangled with silver suns, for the silver sun was the cognizance of all his banners." Hardy, in his new novel of "The Laodiceans," now publishing, describing a walk in the church of Stancy Castle, and the tombs of the knights upon the floor of the ancient church, with their effigies sculptured upon them, thus writes:

* Polyolbion, Song 22 (Drayton, Chalmer's ed.), p. 341, published in 1612.

† From Miseries of Queen Margaret, 1596, p. 112, of Chalmer's Drayton.

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"Some of them wearing around their necks the Yorkist collar of suns and roses, the livery of Edward IV." But I need not give other extracts from English writers to illustrate the prominence which the cognizance of the sun has had in the history of the family of York.

12. The last topic of this evening's undertaking is to mention some of the conclusions of the report of the commission on the correct arms to the legislature, which I am able to do, having been appointed to act as their secretary. Their recommendations to the legislature constitute one of the steps of progress since the reading of the first paper. The commission composed of the governor, the secretary of state and comptroller, recommends the re-establishment of the original arms by a law, in which shall be embodied a full description of the Arms; they maintain as belonging to the Arms all those features which had disappeared or had been strangely altered; they recommend that the departments of the State and the courts shall place no other device on their seals than the Arms of the State, and they propose that the standard of the State bearing the Arms shall be hoisted upon the capitol while the legislature is in session along with the flag of the United States. They recommend that a year shall be allowed to elapse before these recommendations should be enacted into a law, so as to give an opportunity for an expression of opinion on the subject by any who take an interest in it.

This process of retracing our steps to where we started from in 1778, may seem needlessly tedious, but it took Pennsylvania several years to complete its remedial legislation on the subject, and it took Ohio four years to obtain the same results.

The Arms which these fathers of the State have left us as their legacy bring us on the one hand into the direct use of a symbol which for now nearly four hundred years, when found in its appropriate place, has suggested to the mind of the beholder the interests which belong to the name of York; with the difference that the symbol of the Highlands and the Hudson being conjoined in the same shield with that of the sun, the sight now suggests to us the interests and sympathies of the people of the whole State of *New* York. If there be any one who has any doubts about the significance and grand expressiveness for this State of that portion of the device of the Arms which represents the great geographical feature of the State, the chasm of the Hudson river, let him familiarize himself with the eloquent descriptions of the marvelous geographical position of New York in the Union as given repeatedly by Hon. Horatio Seymour in his discourses touching upon the subject, and his doubts will disappear.

The briefest summary of the meaning of our Arms is, that the shield

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symbolizes in the full sun the name and idea of Old York and the old world; the mountains, river and meadow, with the ships, convey the name and idea of the New York of the new world. This New York is supported by Justice and Liberty, and discards monarchy. By exhibiting the eastern and western continents on a globe, the old and new are brought together, while the eagle of the crest proclaims, "Westward the course of empire takes its way."

NOTE.— Four plates, illustrative of the specimens of the arms spoken of in the two preceding papers, will be found at the end of this volume. The drawing of the Arms on Plate IV is unsatisfactory in its outlines and expression, but conforms to the description of them as given by the Commissioners. In the absence of a more artistic representation of them, it has been necessary to print it. It is not a drawing of what had been definitely adopted, but is a sketch of the essentials, which was offered by them to the public, for the purpose of receiving suggestions, previous to preparing new dies for the seals. This is now being superintended by the Secretary of State, under the law of 1882 reëstablishing the ancient arms September, 1882.

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THE PLEA OF INSANITY.

By HORACE E. SMITH, LL. D.

[Read before the Albany Institute, January 31, 1882.]

The extraordinary trial of Guiteau for the assassination of President Garfield has directed public attention with unusual interest to the defense of insanity in criminal prosecutions. The subject involves questions of great importance, and considerable difficulty. It is the aim of this paper to present briefly, in outline, the present *status* of the subject, with some of the difficulties surrounding it, and the vexed questions involved. Its main design is to stimulate thought and discussion, which may contribute to the realization of a more just, uniform, and satisfactory administration of the criminal law, when the plea of insanity is interposed as a defense. The objective point of all inquiry and discussion is, the adoption of such rules and methods as shall be most likely to secure the conviction of responsible parties, and protect the irresponsible when charged with crime, and convicted of the overt act. Now, unfortunately, it often happens that guilty parties escape through the plea of insanity, while sometimes, possibly, the irresponsible insane are convicted and punished. This defense has become so common, and is often interposed on such weak grounds, that the popular mind has come to regard it with marked disfavor, and courts, even, look upon it with a wary and suspicious eye. And yet, if legal insanity really existed when the alleged crime was committed, there is no better or more meritorious defense known to the law. An essential ingredient of crime, especially crime of the grade of felony, is *criminal intent*, and this implies a sane mind, without which such intent cannot exist.

For convenience of presentation, and without special reference to logical arrangement, the subject will be examined under three heads: The *Fact*, the *Law*, and the *Procedure*.

First, the Fact:

The plea of insanity presents a question of fact for the jury which is both a question of *fact* and a question of *science;* not a question of *physical* science, but of *metaphysical* and *psychological* science. If the court and jury, and expert witnesses had to deal with physical facts alone, which may be subjected to the test of experi-

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mental and demonstrative science, their task would be comparatively easy. But they have to deal with the *outward, physical* manifestation of *inward, immaterial, occult* forces.

The astronomer, by the aid of his instruments and mathematical science, is able to make an accurate survey of the heavens, weigh the planets as in a balance, and trace their orbits with unerring precision. The scientist, with his glass, reveals the wonders of the microscopic world, and makes the solid earth seem instinct with organic life. But with what instruments shall the psychologist examine the soul? By what science, pure or applied, shall he determine its nature? By what mathematics, speculative or mixed, shall he unfold with precision its laws and powers? The surgeon cannot subject it to his knife, nor the anatomist to his scalpel; it is beyond the power of chemical analysis; it will not respond to the inquisition of the microscope. What is it? Where is it? What is the *fact* and the *law* of its connection with the body? These and other questions may easily be asked; but an attempt to answer them satisfactorily will at once reveal the intrinsic difficulties involved.

And these difficulties are presented by the mind in its *normal* state, studied by a mind in the same condition, when the investigation is aided by introspection, the observer beholding in himself, as in a mirror, the general features of his study.

But how immeasurably are the difficulties increased when the subject is a mind in an *abnormal* state; when, instead of light and divine order, there is darkness and tumultuous chaos; and when the student finds no assistance from corresponding features within himself!

Dr. Elwell, in a recent issue of the North American Review, writes thus: "The human mind, connected as it is with matter, so far as we know any thing about it, in its best estate is an unknown quantity, having no unit or standard of measurement by which it can be accurately defined. Hence it is often most difficult, or even impossible, to determine precisely when there is a departure from a healthy standard or normal condition. No two individuals being alike in their normal condition of mind, it follows that each must be his own standard for comparison, and that an uncertain one. No words in the language have yet been able to define mind, sane or insane; and it has no synonym but mystery. Over the portal that leads to the luminous temple where thought dwells, the pilgrim who would enter there sees written in letters of living light the inscription: 'Put off thy shoes from off thy feet, for the ground whereon thou standest is holy ground.' It is the temple of an unknown God, and whosoever would rush unbidden into this presence, thinking to sit face to face with and

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understand its mysteries, is but little less than a madman himself. Whether the subject be sanity or insanity, it will be found firmly and securely intrenched behind ramparts, and surrounded by insurmountable difficulties—*a terra incognita.*"

The difficulties are augmented by the great variety of forms and hues which mental alienation assumes. From the raving maniac, exhibiting the fury of a demon and the strength of a giant, there are all degrees and shades, down to the imbecile, or the morbid misanthrope seen in the picture of Byron, as drawn by himself in his Manfred.

The perplexities of metaphysical study are also enhanced by inharmonious theories on the subject of mental unsoundness.

The leading schools are the *psychic* and the *somatic.* The former is based on the assumption that the primitive source of insanity is in the *soul* itself, and that the soul is what originally suffers, imparting, when there is sympathetic insanity, its malady to the brain.

The latter, the *somatic* theory, assumes that the soul itself, as such, is incapable of originating a disease; that the occasion of every affection of the mind is to be found in some abnormal bodily development; and that aberrations of the mind are nothing more than disturbances of some functions of the soul produced by bodily abnormities.

There is a third, or *intermediate theory,* which attributes to the body and the soul alike originative influence in the growth of mental disturbances. This theory has able advocates, and may be the golden mean of truth between the two extremes. There are phenomena difficult, if not insusceptible, of explanation upon either of the extreme theories alone; and the intermediate theory, which recognizes the reciprocal influence of body and soul in mental alienation, seems to resolve some difficulties not otherwise explainable. While these conflicting theories complicate medico-legal investigations to a considerable extent, they are not so embarrassing as might at first view be supposed. And this for the reason, that whatever theory be adopted respecting *cause,* medical experts have to deal mainly with *effects.*

The disciples of the *psychic* and the *somatic* school alike deal with phenomena, which in particular cases are the same, whether the producing cause originated in the body or in the soul. While it is easy for medical experts to differ when interest or feeling excites antagonism, on the other hand, it is comparatively easy for them to agree when they speak to the *phenomenal* rather than the *causal* character of the case before them.

In all matters of science and philosophy, and especially on metaphysical and psychological subjects there always has been, and prob-

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ably always will be, a tendency to speculative *theories* and over-worked *hobbies.* Men of a speculative cast of mind, and a controversial disposition, will sometimes frame a theory upon a very limited number of facts, experiments, or observations, and thereafter adjust every thing to *it;* bending facts and phenomena to such theory when they will yield, and boldly questioning or ignoring them when they will not. There are few men who possess the requisite force and grasp of intellect, combined with a well-balanced mental organization, coolness of judgment, freedom from emotional disturbance, patience to wait the slow processes of inductive methods, and perseverance to push them to legitimate results, which are indispensable to safe conclusions in the realm of psychological investigation. Such men there are, however, and they are making steady advances in psychological medicine; and we may reasonably hope that at no distant day their labors will result in relieving medical jurisprudence from some of its present embarrassments.

Within a comparatively recent period *moral insanity* has become a disturbing element in criminal jurisprudence. By this name is meant insanity of the *moral* system, co-existing with sanity of the *mental.*

It assumes that the moral and mental functions are so separable that one can be insane without involving the other; and that this severance actually exists in cases of moral insanity. It is claimed by the highest authorities that this species of alleged insanity has, psychologically, no existence; and it is generally repudiated as a legal defense. It will have been noticed by readers of the Guiteau trial, that the most distinguished experts there examined deny the existence of moral insanity. It still finds distinguished advocates, however, both among alienists and jurists; and even when overruled as a defense, it doubtless sometimes creeps into the jury-box and secures a verdict of not guilty, against law and evidence.

The perplexity caused by this alleged species of insanity is greatly increased by its numerous subdivisions into the large and increasing family of *monomanias.* Among these may be mentioned homicidal mania, kleptomania, pyromania, erotomania, pseudomania, oikeiomania, dipsomania, fanatico-mania, and politico-mania. In his testimony on the Guiteau trial, Dr. Gray stripped from some of these *manias* the Greek costumes in which they had posed and *im*posed, and left them in their naked deformity and moral depravity, as *murder, arson, theft,* and *drunkenness.* Under the nomenclature of moral insanity, a person may lie, steal, ravish, burn and kill, *ad libitum,* and go unwhipped of justice.

The doctrine once fully established and universally recognized, that

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there can be no *moral* insanity independent of *mental*, a convenient cover for moral depravity will have been removed, and the administration of criminal justice relieved from much embarrassment.

Secondly, the Law:

When insanity is interposed as a defense, the court lays down the rule of criminal responsibility, and the jury pass upon the fact of insanity. In dealing with the issue a clear discrimination between *medical* and *legal* insanity is of the first importance. A recognition of the doctrine that the presence of medical insanity is not of itself alone a valid excuse for crime will greatly narrow and simplify the question.

Establish a uniform rule touching legal responsibility, and so far as the administration of justice is concerned, it would matter little how wild the theories, or how fierce the conflict in the domain of medical insanity.

What is the true rule in respect to penal responsibility?

In 1843, the English House of Lords propounded certain questions on this point to the fifteen judges, and received in substance the following answer:

"The jury ought to be told in all cases that every man is presumed to be sane, and to possess a sufficient degree of reason to be responsible for his crimes until the contrary be proved to their satisfaction; and that to establish a defense on the ground of insanity, it must be clearly proved that, at the time of committing the act, the party accused was laboring under such a defect of reason from disease of the mind, as not to know the nature and quality of the act he was doing, or if he did know it, that he did not know he was doing what was wrong."

This rule, as an abstract proposition, is adopted by the English courts; but, like most common-law rules, it is flexible, susceptible of adaption to various circumstances, and the judges have been liberal in its administration. It is termed, in common parlance, the "right and wrong test," and is applied with greater or less strictness in many, perhaps a majority, of the American States.

Were this the only and the uniform test of responsibility, the issue of insanity would be comparatively simple. But it is held by high authority, and with much strength of reason, that the "right and wrong test" is not in all cases the only one by which penal insanity is to be tried.

It is claimed that the defense is sustained when, first, there was an insane delusion from which the crime emanated; and secondly, that when being insane the defendant was forced to the act by an irresist-

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ible impulse, although in each case he knew that the act was forbidden by the laws of the land.

These propositions may be stated with a little more fulness and accuracy, thus: "First, when the defendant was acting under an insane delusion as to circumstances, which, if true, would relieve the act of responsibility, or where his reasoning power is so depraved as to make the commission of the particular act the natural consequence of the delusion." Secondly, "where the defendant, being insane, is forced by a morbid and irresistible impulse to do the particular act."

Under the present English practice, "the delusions which indicate a defect of sanity such as will relieve a person from criminal responsibility are delusions of the senses, or such as relate to facts or objects,—not mere wrong notions or impressions, or those of a moral nature; and the aberration must be *mental* not *moral*." It is not enough that the delusions show a diseased or depraved state of mind, or an abnormal condition of the moral feelings, if the sense of right and wrong, although perverted, be not destroyed.

There is some contrariety of opinion upon this question among the jurists of this country, but the trend is in favor of the insane delusion defense, under proper limitations.

It is important to notice that the delusion constituting a defense must be that of an *insane* person.

If he has sufficient reason to dispel or correct the delusion, and refuses or fails to do so, he is responsible before the law. One author, in illustration of this point, says:—"Thus the Mormon prophets claim, it is said, a direct revelation permitting them to practice polygamy. Would they be permitted to plead their delusion in this respect as a bar to an indictment? Certainly not. And the reason is, that they are shrewd, sane men, and must therefore be held responsible for their delusions."

There are many recorded instances of men subject to delusions, who were sane beyond question, and had full control of themselves. For example, Lord Castlereagh, who had a vision of the "Radiant Child;" President Lincoln, who, at the same view, saw two images of himself in the mirror; and who, according to his biographer Lamon, "was readily impressed with the most absurd superstitions;" and Lord Kenyon, who had a morbid apprehension of impending poverty.

There is a marked contrast between these instances and cases in which the delusion has so extended as to implicate the whole mind, producing incoherence of thought and speech. Dr. Rush reports the conversation of a patient belonging to the latter class, as follows:—

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"No man can serve two masters. I am Philip King of Macedonia, lawful son of Mary Queen of Scots, born in Philadelphia. I have been happy enough ever since I saw General Washington with a silk handkerchief in High street. Money commands sublunary things, and makes the mare go; it will buy salt mackerel made of ten-penny nails. Enjoyment is the happiness of Virtue. Yesterday cannot be recalled. I can only walk in the night-time when I eat pudding enough. I shall be eight years old to-morrow. They say R. W. is in partnership with J. W. I believe they are about as good as people in common — not better, only on certain occasions, when, for instance, a man wants to buy chincapins, and to import salt to feed pigs. Tanned leather was imported first by lawyers. Morality with virtue is like vice not corrected. L. B. came to your house and stole a coffee-pot, in the twenty-fourth year of his majesty's reign. Plum-pudding and Irish potatoes make a very good dinner. Nothing in man is comprehensible in it. Born in Philadelphia. Our fore-fathers were better to us than our children, because they were chosen for their honesty, truth, virtue and innocence. The Queen's broad R. originated from a forty-two pounder, which makes too loud a report for me. I have no more to say. I am thankful I am no worse this season, and that I am sound in mind and memory, and could steer a ship at sea, but am afraid of the tiller. * * * Son of Mary Queen of Scots. Born in Philadelphia. Born in Philadelphia. King of Macedonia."

There can be no doubt of insanity in this example; but it may be considered as a sound and pretty well-established doctrine, that a delusion in a sane person does not relieve him from responsibility.

It is important, also, to notice that an *insane* delusion is a good defense, only when the act charged as a crime was the offspring of such delusion.

The defense of "irresistible impulse" is rejected by the English courts, but is recognized as valid in some American authorities. In Iowa, Chief Justice Dillon, delivering the opinion of the Supreme Court in the case of Felter, tried for the murder of his wife, said;— "The capacity to distinguish right and wrong is not in all cases a safe test of criminal responsibility. If a person commit a homicide, knowing it to be wrong, but driven to it by an uncontrollable and irresistible impulse, arising not from natural passion but from an insane condition of the mind, he is not criminally liable." The "irresistible impulse" allowed by some courts as a valid defense is not, it must be remembered, "*moral insanity*" as already defined; it is not the stress of passion, nor is it the expression of malignant depravity; *it is the overpowering force of insanity.*

There is not so wide a difference, practically, on the question of legal insanity, as an affluent and varied nomenclature naturally suggests.

Dr. Folsom, in the same number of the North American Review

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from which we have quoted, thus sums up the conditions of legal responsibility at the time of the act: — "First. Sufficient mental capacity for ordinary reason, reflection, and judgment. Secondly. The knowledge of right and wrong as applied to the particular act. Thirdly. The power of self-control within reasonable limits. Fourthly. The absence of insane delusion overpowering reason — the character and strength of the false belief to be judged in each particular case and not by any general definition of insane delusion, that being impossible."

The question of the burden of proof in cases of alleged insanity has elicited much discussion, and resulted in considerable confusion and conflict in judicial opinion.

It may be considered as quite well settled that *sanity* being the *normal* and generally the *actual* condition of the mind, is always presumed. The prosecutor may rest upon this presumption until evidence of *insanity* is introduced for the defense. Just here comes the conflict. What degree of evidence is requisite to overcome the presumption? After the introduction of such evidence for the defense, does the burden rest upon the prosecution to satisfy the jury beyond a reasonable doubt, that defendant was legally sane when he committed the act? There are several theories.

First. That insanity as a defense, the same as what is technically known as confession and avoidance, must be proved by defendant beyond a reasonable doubt; and unless such proof be furnished, the case for the prosecution being otherwise proved, the jury must convict. This view was taken by the late Chief Justice Hornblower, of New Jersey, a man of great worth, and a jurist of distinguished ability; but it is not generally adopted.

Secondly. That upon the issue of insanity the jury must be governed by the *preponderance* of evidence; that while the burden is on defendant, he is not required to prove insanity beyond a reasonable doubt.

Thirdly. Another view which has some earnest advocates is, that on the issue of insanity, the burden is on the prosecution to prove sanity beyond a reasonable doubt.

Fourthly. That upon the main issue of guilty or not guilty, the burden of proof rests upon the prosecutor from the beginning to the end of the trial. That to secure a conviction, it must be shown that the prisoner was sane when he committed the act, and for the reason that he cannot be guilty if a sane mind never assented to the act, and the fact of such assent is put in issue by the plea of "not guilty." But, upon the particular question of insanity, the *presumption* is

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sufficient for the prosecutor in the first instance. When, however, evidence of insanity is introduced, it must be considered in connection with the presumption, and if, when so considered, the jury have reasonable doubt of the prisoner's sanity, they must acquit.

This is substantially the doctrine in New York as authoritatively announced by the Court of Appeals.

It is forcibly and plausibly urged in an approved work on Medical Jurisprudence, that this conflict is due to the mistake of viewing the plea of insanity as in some way entering into the merits of the question of innocence or guilt. That the maxims of criminal jurisprudence constructed to guide in determining the question of guilt or innocence have no application to the issue of insanity. That the presumptions of innocence and of intent assume that the defendant is either innocent or guilty, but if the plea of insanity is good, he is not a moral agent, and can be neither. "The defense being," it is said, "that he is not amenable to penal adjudication — that he is a being outside of the law — the maxims as to guilt or innocence belong entirely to another issue, and have no relevancy."

This reasoning, so far as it applies to the question of the burden of proof, makes in favor of the rule requiring a preponderance of evidence to sustain the plea of insanity. And the weight of judicial authority has been in the same direction, but the tendency seems now to be in favor of the rule adopted in this State.

Whatever may be said of the logic of this rule, practically its application meets serious difficulties. If the burden of proving sanity beyond a reasonable doubt to the minds of an average jury be thrown upon the prosecution, it is quite apparent that the task of securing a conviction for a capital crime becomes exceedingly difficult. The almost infinite grades of insanity, its variable and accommodating nomenclature, the conflicting theories of psychologists, the unsettled rule of criminal responsibility, the facility of procuring extraordinary expert testimony, and the weakness of juries would conspire to embarrass the prosecution, and insure impunity to crime.

The question,— what is the true theory of civil government, and the purpose of penal law? has some bearing upon this subject. Does human government deal with man simply as a member of society, or does it take cognizance of his relations to the divine law, and assume to enforce its claims and sanctions? Is punishment for crime designed as a protection to society, or as a moral discipline for the transgressor? Each of the theories indicated by these questions has its advocates; and there are, moreover, afloat in community some very crude notions upon the general subject. The adoption of a cor-

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rect theory is important in adjusting the true standard of responsibility for insane criminals. If human government regards and treats man simply as a member of society, and inflicts punishment for crime as a protection to society, it is manifest that a stricter rule of responsibility is allowable, nay, *indispensable*, than would be the case should it attempt to adjust its penalties by a moral scale, and make the good of the offender's soul the purpose of the criminal code. The latter theory, carried to its logical result, would require the abolition of capital punishment; and it would be an interesting inquiry whether the opponents of capital punishment do not, as a rule, adopt an erroneous theory of government. What *is* the true theory? This question is answered by ex-President Hopkins, one of the most profound thinkers of the age.

In a discourse delivered before the Legislature of Massachusetts discussing the relation of the divine and human government, respectively, to the ends of individual and of social existence, he says "that human governments regard man solely as a member of community; whereas it is chiefly as an individual that the government of God regards him.

"Human government is chiefly a system of restraint for the purpose of protection. Its object is to give equal protection to all in using their faculties as they please, provided they do not interfere with the rights of others. Government, then, is not an *end* but a *means*. Society is the end, and government should be the agent of society, to benefit man in his social condition."

Dr. Elwell, in the paper from which we have quoted, thus forcibly presents this view in its relation to the plea of insanity: "The theory upon which government proceeds to punish crime by the infliction of the death penalty, and upon which alone it can be justified, is that the existence of the criminal is dangerous to society, and that society can only be protected by his death. Human law in these cases has nothing to do with the moral guilt of the offender. It undertakes to protect society, and punishes for that purpose only when the punishment is death. If government attempts to reform the criminal, as is sometimes the case in crime less than capital, even then the primary object is the good of society, and not that of the offender. Criminal law is established by society for its own protection — not for the indulgence of revenge on the one hand, nor of a tender sentimentality in favor of the criminal on the other. Certainly, the community at large has the same right to protect itself, even to the taking of the life of an insane murderer, if need be, that an individual has when assailed with murderous intent."

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In seeking the true rule of responsibility for insane criminals, some weight should be given to the fact that the fear of punishment is as great in the insane as in the sane, and has the same restraining influence. "In cases of low mental and moral culture," says an approved author, "the will, when on the brink of some forbidden act, is swayed by two conflicting motives, *passion* and *fear*. Fear, in such cases, is the only check on passion. If it is removed, passion has no remaining barrier in its way. The State which declares that no irrepressible passion shall be punished evokes the irrepressible passion it exempts. The necessary check on passion is fear; and punishment must be applied by government with such even hand that fear will be real and reasonable." The London *Lancet* says: "No doubt mental disease is mysterious in its operations and manifestations. No doubt weakened mental power and a low standard of moral sense leave mankind an easier prey to violent passions or criminal desires. It is equally true that such natures are more easily controlled and influenced by the fear of punishment."

If these authorities are right, and penal law is designed primarily and mainly for the protection of society, it would seem to follow, necessarily, that the rule of responsibility for insane criminals cannot properly or safely be relaxed.

Thirdly, the Procedure:

At present, both in England and in this country, generally, the question of insanity is tried by the court and jury with the other issues in the case. The court lays down the rule of legal responsibility, and the jury determine the fact of sanity or insanity. In doubtful cases and, indeed, in most, if not all cases, expert testimony is submitted for the consideration of the jury on the question of insanity. This procedure is often embarrassing and unsatisfactory. It unites issues unlike in their character, and in the kind of evidence apposite to each. If the prisoner is insane at the time of his trial he should not be tried at all while in such a state. He is incapable of pleading, of employing counsel, or of conducting his defense. He is a person "*beside himself*," and if he was in the same mental state when the act charged as an offense was committed, it was not his act but the act of another person, the person "beside himself." He is not amenable to penal jurisdiction; and the joinder of the two issues in one trial involves a kind of judicial solecism, which naturally, if not necessarily, leads to confusion and embarrassment.

If the question of insanity could first be determined by a competent commission, or otherwise, the administration of criminal law in such cases would be much more simple and satisfactory.

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Another and a more serious embarrassment in the procedure arises from the necessity of submitting the delicate, and often very difficult question of insanity to an ordinary jury.

The English jury system, which we inherit, has long been a theme of unqualified panegyric; and it must be conceded that, during some periods of English history, it stood between the sovereign and his subjects, a bulwark to the latter against the oppressive rule of the former. But it may well be questioned whether the system has not outlived its usefulness, especially under a popular government.

In criminal cases, and notably where capital punishment follows conviction, ignorance is the prime qualification of the jury. Each juror drawn is challenged, and if he has formed such an opinion of the guilt or innocence of the prisoner as would require evidence to change, he is generally held disqualified. In this age and quarter of the world, all intelligent persons read the newspapers; the newspapers publish accounts of homicides, especially those occurring in the vicinage; no person can read these accounts without forming such an opinion as would require evidence to change; and hence, intelligent persons are, as a rule, excluded from the jury box. Under such a system, what does the average juror know of insanity in its occult phases? Just about as much as he knows of Hebrew, or the nebular hypothesis of La Place. Experts, called on both sides, give conflicting opinions couched in language unintelligible to ordinary laymen; a long cross-examination follows, which sometimes only "darkens counsel"; then follow the arguments and appeals of counsel, which serve to dazzle and bewilder; and finally the judge delivers his carefully prepared charge, formulated with reference to the diverse theories and judicial conflict upon the vexed question, and better adapted to the understanding of a lawyer or an expert than to an unlearned jury. By this time the jury know less, if possible, about insanity and the prisoner's mental condition than when the trial commenced. On retiring to their room, if they enter upon discussion, like Milton's devils they "find no end in wandering mazes lost." The result will be a disagreement, or a *profound* united *guess;* and if the latter, the chances are that an insane man will be executed for an irresponsible act, or that a responsible murderer will be let loose upon society.

Curran once very cleverly satirized the jury system in a trial before Lord Avonmore, who piqued himself, and not unjustly, on his profound classical acquisitions. Phillips relates the anecdote as he heard it from Curran's own lips. The latter was addressing a jury of Dublin shop-keepers, so stupid and so illiterate that the finest flights of his eloquence were lost on them; "I remember, gentlemen," said he, steal-

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ing a side glance at the unconscious and attentive Lord Avonmore, "I remember the ridicule with which my learned friend has been pleased so unworthily to visit the poverty of my client; and remembering it, neither of us can forget the fine sentiment of a great Greek historian upon the subject which I shall take the liberty of quoting in the original, as no doubt it must be familiar to all of you. It is to be found in the celebrated work of Hesiod called the *Phantasmagoria.* After expatiating upon the sad effects of poverty, you may remember he pathetically remarks:

'Nil habet infelix paupertas durius in se
'Quam quod ridiculos homines facit.'"

Lord Avonmore bristled up at once: "Why, Mr. Curran, Hesiod was not a historian — he was a *poet*, and, for my part, I never heard before of any such poem as the *Phantasmagoria.*" "Oh, my good lord, I assure you he wrote it." "Well, well, it may be so; I'll not dispute it, as you seem to be so very serious about it; but, at all events, the lines you quoted are *Latin*, they are undoubtedly Juvenal's." "Perhaps, my lord, he quotes them from the Phantasmagoria." "Tut, tut, man, I tell you they are *Latin;* they are just as familiar to me as my Blackstone." "Indeed, my good lord, they are Greek." "Why, Mr. Curran, do you want to pursuade me out of my senses? I tell you they're *Latin;* can it be possible that your memory so fails you?" "Well, my lord, I see plainly enough we never can agree upon the subject; but I'll tell you how it can easily be determined. If it was a legal question, I should of course bow at once to the decision of your lordship; but it is not — it is a mere matter of fact, and there is only one way I know of deciding it; send it up as a collateral issue to that jury and I'll be bound they'll *find it Greek.*"

When the joke flashed upon the simplicity of Lord Avonmore, he literally shook with laughter.

One of the most serious embarrassments incident to the procedure is that arising from expert testimony. This class of testimony is, in most cases, a necessity. Questions to which alienists speak on the witness' stand are often intrinsically difficult,— questions upon which there are honest differences of opinion among men of undoubted scientific attainments; but the worst difficulties encountered are adventitious.

In the first place there is no rule or standard by which courts can determine who is and who is not entitled to speak as an expert. True, it is said that "neither quacks" nor mere speculative theorists are admitted as experts. But who are "quacks" and who mere speculative theorists? And how shall courts decide these questions? A

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late writer well says, "Either the court must distinguish between rival schools, in which case it determines in advance the renditions of science as to which the experts are to testify; or it must decline so to decide, in which case there is no ground of discrimination of any kind between professed experts. This virtually breaks down the distinction between experts and non-experts."

It is a matter of common experience that persons wholly unqualified are admitted to testify as experts; and such witnesses often speak with an assurance rarely seen in men of profound scientific attainments; thus verifying the saying that "fools rush in where angels fear to tread."

Besides this inevitable embarrassment under the present system of procedure, there are abuses which more than merely justify criticism.

The unseemly spectacle is often witnessed of medical experts arrayed against each other in a cause, and not only giving wholly contradictory testimony upon the same question, but manifesting all the partisan zeal, and frequently more bitterness of antagonism, than is exhibited by the opposing counsel. This results, in part at least, from the volunteer position of experts, which is sometimes termed the Anglo-American practice. Each party selects witnesses holding views to suit his purpose, or he retains them as he does his counsel, to take care of and advance his interests. They are generally well paid for their services, sometimes larger fees, even, than counsel in the cause. Thus, interest and the zeal of a paid retainer are added to professional pride and jealousy, the sure outcome being a painful, not to say disgraceful, scene in court. It is scarcely in human nature, under such circumstances, for a witness to resist the temptation of becoming a partisan, and manifesting feeling wholly unbecoming the position. It is scarcely too much to say,— there is no theory of insanity, however wild and absurd, and no perversion of facts and science, however monstrous, that have not been subsidized in criminal jurisprudence, under the guise of expert testimony. No witness, and especially no *professional* witness, should be subjected to such a strain. Applied here, as wheresoever, in all the relations and activities of life, there is great significance in the prayer, "*Lead us not into temptation.*" It is apparent at a glance that under the present procedure, with its attendant abuses, there will be great difficulty, often, in ascertaining the truth. "Who shall decide when doctors disagree?"

One remedy proposed for some of the evils incident to the Anglo-American practice, is the adoption of the German system. Under this system, medical experts are appointed by the State. They are selected from men scientifically trained, who have successfully passed an examination in the specialty of medical jurisprudence, in the manner

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prescribed by law. In some of the German States, for every county there are appointed a governmental physician and surgeon, who are charged with the duty of examining and reporting upon cases requiring medico-legal investigation. If they differ in opinion, an appeal may be taken to a medical college appointed for the province, composed of men of peculiar experience and knowledge in medical jurisprudence. Then there is a final appellate court established for the entire State. "Thus, in Prussia," says a German authority, "we have (1) the county physician and county surgeon; (2) the medical college of the province, consisting of the chief-president, the governmental counselors, a pharmaceutical assessor, and a physician whose specialty is the disease of animals; and (3) an appellate medical commission for the whole monarchy."

Such a system as this eliminates from medico-legal investigations all interested testimony, and gives to the court and jury the unbiased judgment of thoroughly competent alienists, instead of the conflicting and perplexing jargon of feed experts, or the audacious utterances of brazen empirics.

Under our government and constitutional provisions there might be some difficulties in the way of adopting such a system, in its completeness, not encountered in the German States. But were governmental expert commissions established, the courts might at least refuse to put an alleged insane criminal on trial for the offense charged, until advised by such commission of his legal responsibility; and, should the prisoner, after being declared responsible by the commission, insist upon the plea of insanity in his defense, the opinion of one of the commissioners would outweigh the testimony of a cohort of hired experts. Until some change occurs in the present system, alienists will of necessity be called as witnesses. And if called, and required to leave their business and attend the sessions of a court for days, and perhaps for weeks, it is only simple justice that they should be fully compensated; and they are not obnoxious to just criticism for demanding and receiving compensation. Such, only, as yield to the temptation of virtually selling their testimony for a price are fairly open to censure.

Honorable members of the profession may do much to alleviate somewhat the worst features of the present expert system. Let them insist upon a high standard of professional honor and practice in the matter; firmly resisting all inducements to swerve a hair's breadth from the line of rectitude, or the dictates of judgment and conscience, for the benefit of either party; and frowning indignantly upon the mercenaries in their ranks, who, by yielding to the lust of gain degrade their high calling.

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The court and legal profession may also do much to correct this evil. To them it is well known, and peculiarly obnoxious; and there is no class of men who are quicker to see and condemn, and more prompt to remedy any practice which obstructs the due and pure administration of justice than the much abused lawyers.

It is exceedingly desirable that the courts throughout the Union should harmonize upon the question,—What constitutes legal insanity? It is also important that they should adopt a uniform rule in respect of the burden of proof. Such agreement would relieve trials of much confusion and embarrassment, and tend to certainty and uniformity in the administration of criminal law. It could not then well be, as now, that a criminal, tried in New Jersey and sent to the gallows, would, if tried in Indiana for the same offense, and on the same evidence, be acquitted.

But what is needed most of all, perhaps, is a sound and wholesome public opinion on the subject; an opinion that shall embody itself in legislative enactments, sustain courts in the administration of penal law, and furnish spinal qualifications to juries.

There is a morbid, ill-directed sympathy, a tender sentimentality, abroad in the land, which expends itself upon the assassin, while overlooking the desolate home and broken-hearted friends of his victim. Weak men and silly women seek the murderer's cell, and strew it with flowers, with as much fervor of sentiment as the religious devotee visits the shrine of his idolatry. The tendency of this sickly sentimentality is, to disarm justice and break down the safe guards of society. It often pervades the jury box, and sometimes finds a responsive chord in the breast of the judge.

One most deplorable effect is the stimulus given to lynch-law. On the occurrence of some peculiarly atrocious crime, the popular indignation is aroused, and bold, impulsive men, lacking confidence in the ordinary and lawful methods of justice, take the law into their own hands, and inflict swift vengeance!

Such acts of unlawful violence are severely and justly condemned; yet it cannot be denied that they are often prompted by that deep-seated abhorrence of murder, and innate sense of its guilt that drew from Cain the cry of terror,— "Every one that findeth me will slay me."

The remedy must be sought in a uniform, well-adjusted system of criminal jurisprudence, which, administered by magistrates and juries possessing intelligence, and the combined attributes of justice and mercy, and sustained by a sound and vigorous public opinion, will protect the innocent, and mete out just and sure punishment to the guilty.

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LINGUISTIC DISCUSSIONS.

By George R. Howell.

[Read before the Albany Institute, March 28, 1882.]

I have used the title of this paper as a means of introduction, for your consideration, of some thoughts, mainly on the pronunciation, changes and growth, of the English language. It makes no pretension to a formal treatise, but is rather a collection of notes made during many years' reading, and as they are connected with our mother tongue, they may be supposed not to be without interest to us all. In a sort of discursive way we shall pluck what fruit best suits our convenience from the broad field of our language and its literature. And first, in this quest of an hour's entertainment, if you please, we will consider some of differing and the unsettled pronunciations in this present stage of the language. It should be laid down dogmatically and categorically as an axiom, that the nation that has a written language should pay some respect to its letters as constant symbols of sound. Formed as the English language is of a low German and a dialect of the French, modified by Scandinavian influences with modern additions from the Latin and Greek, it is more or less subject to the laws that govern the structure and pronunciations of these several languages. Thus from the low German we obtain the broad sound of *a* as in *all* *; from the French the short sound of *a* as in *matter*. And in many cases we can on this principle refer the origin of the words containing these vowel sounds to their respective source in France or Germany. There is one class of words, those ending in *ough*, whose pronunciation cannot be accounted for by this method. *Bough* and *rough* are both of Saxon origin, and the only apology we can offer a foreigner for the existence of such anomalies is that the spelling of them was begun in times of ignorance. It was the printer, not the mass of readers, nor even of writers, who began to demand uniformity in spelling. And at first even they spelled phonetically with a wide margin, and a given word was apt to masquerade under as many forms as the ingenuity of the printer could devise. These apologies for the irregularities of pronunciation may, with a good conscience, be given by the upright man, in a large number of words coming into the language from different national sources, or receiving their external shape in the chaotic or

* By this I do not mean that the high German gives to *a* the sound of that letter in *awe*; but that words having that sound in English are of low German origin.

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forming period — that is, a period of ignorance ; but the upright man sinks back in dismay when he is confronted with the mode now in vogue of pronouncing certain other words to be presently considered. An illiterate people may be excused for considerable variation in pronunciation, but is it fair treatment to the shade of Mr. Webster, supposing it given to traveling, to hear thar and whar in North Carolina, theer and wheer in Virginia, thare and whare in New England, and there * and where in New York ? Being somewhat of an old fogy in regard to pronunciation, and mindful of unaccustomed sounds I sometimes hear, it was with a degree of trepidation that I inquired lately of one of the teachers in our public schools whether they ever had occasion to teach the alphabet. But the question was not the cause of my trepidation, it only led up to it. Being informed that such was the case, I then anxiously sprung my real question, "Do you teach the scholars to name the first letter of the alphabet *a* (long) or *a* (short) as its proper normal sound ?" "Why, *a* (long) of course." Although I did not pursue the subject any further verbally, yet mentally I asked myself a million questions, or less. N-a-t-i-o-n — nātion, n-a-tion-al — năshenal. During the civil war, however, we even heard of soldiers' răshions (rations). But he who says nashenal† should also say nashion, stashion, stashionary and all the other ations and ationaries in the language. So long as we recognize the fact that there are general fundamental laws governing the letters, ascribing to them certain fixed sounds, so long it seems obligatory to respect those symbols and not vary from them as whims or fashion may chance to dictate.

In this connection I venture modestly to question the propriety of saying ither and nither. The best students of old English are agreed that these words were formerly pronounced ayther and nayther. But they conformed in process of time to the pronunciation of other words containing the diphthong *ei* so as to become eether and neether. If there is another word in the language besides *height* and *sleight* where *ei* takes the long *i* sound, I do not now recall it, and in the first of these words, the *e* is an interloper. *Height* as derived from the adjective *high* of course needs only the *t* to make it the abstract noun. And the same may be said of *sleight*. By etymology the *e* has no right to be in the word at all. As for *either* and *neither*, there is certainly no philological reason for pronouncing these two words with the long *i* sound, and as devotees of science we can admit no other law to influence us.

Our language is a growth like a living organism, and the process is so gradual as to be imperceptible. Particularly is this true of the

* E as in *père*. † First *a* as in hash.

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pronunciation. There was a time in the history of the language when the normal first sound of *a* was *aw*, and when all the other vowels were sounded as near as may be like the corresponding ones in German. But no man can put his finger on any particular period and say that in such an age or generation that change of the vowel sounds took place. Some time since I made a study of some of the poems of Thomas Sackville, Earl of Dorset, who lived from 1536 to 1608, and of John Donne, who lived 1573 to 1631. Among the rhymes taken at random are: were and fear; fear, there and bear; peer, hear, year and dear; there, and uprear; there, hair and where, and consequently all these interchangeably used with each other; wears and tears (the noun); bred and dread; dread and need; beat and great; heart and smart; wheel, smile and while; shine, fine, and seen; grief, chief, life and strife; blood, stood, food and good; draught (a drink) and taught; thought and fraught; plaint and torment: stone, one, anon; reward and regard; wound (to injure) and found. But how these rhyming words were then pronounced is more than any one now living can tell.

PROPER PRONUNCIATION.

There are two grand divisions of the English speaking people who are affecting the pronunciation of the language; first, the conservatives, and second, all the rest. The conservative element for the most part is to be found among scholars. The aim of the student is to discover truth and then maintain it. He need not be tauricephalous about it, but should be firm to lead rather than easily to be led by ignorance. A scholar would be apt to say muséum and not *mus*ĕum, héroine, and not hĕroine, because he knows the *e* in these words has been handed down to us as long in quantity. He would, however submit to the idiomatic laws of the language and say *geo*graphy and not *ge*ography. He would observe the rule that where no violence is done to the general laws of the English pronunciation, the quantity of the vowels in the original tongue is to be retained. When a given pronunciation is once adopted as a standard, although he knows it to be a corruption or degradation of an older correct one, he will accept it and try to have others do the same. And just here he will be opposed by others still more conservative than himself, the illiterate. They, for instance, have heard their fathers and grandfathers say *arth* and *larning*, and they will regard it as an affectation to hear you pronounce these words earth (urth) and learning (lurning). So far as preserving the old and true and best pronunciation of this class of words is concerned, the illiterate are right—but they are not right in not accepting a decision rendered

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by a large majority. They forget that they are the ones to follow, and not to lead in this matter. In other things in which they are authority as experts they may lead unchallenged. But then again there is always something in our language undetermined on which scholars as experts are divided. The wars of the dictionaries have been as eager, if not as deadly, as the wars of the roses. Doubtless there are some words upon which the only settlement is an agreement to disagree. But there are many words that ought to have been eliminated from the fight long ago, on which we are at variance. The statement of a simple rule will serve to introduce some of this kind. The rule is that a foreign word, before it is naturalized, should be written in italics to show it to be a foreigner, and that it should have the pronunciation that good usage gives it in its native tongue. When, however, it has become naturalized so as to be written in Roman letters, it follows as near as may be the laws of the language of its adoption. Thus *envelope* italicized should have its French pronunciation *onvelope*, but the word as we write it in Roman characters and use it as an English word, has no more right to a French nasal than enemy, or engage, or a hundred others. How would this sentence sound from the lecture forum, the French nasal sound being given to the syllables in italics? "I am *en*chanted to tell you that in the *en*gagement with the *en*emy the *en*tire army was captured in the *en*virons of the city before darkness *en*veloped them." The same rule demands that we should either spell *depot* with two p's or pronounce it deepo. This refusal to yield to the laws of common sense as well as the common law of the language is very awkward for me to characterize as it deserves. But the rule, however, of assimilating foreign words to the language is a necessary and pitiless one. Sooner or later all will have to yield to it. A lady of my acquaintance has prophesied the day will come when people will say, "the debut of Mr. So-and so was received with eclats of applause." And why not, since debriss* (debris) is already quite current? The strongest opponent of this thorough lingual incorporation—this domestication of foreign words into the language, is doubtless fashion, which may be regarded as one branch of "all the rest" of the forces influencing pronunciation. And in this case fashion is about synonymous with pedantry. Fashion may dictate the cut of a garment, but it confronts a nobler spirit than itself when it presumes to dictate to the genius of a language. But such cowards are we all before it that we bend when we should stand as firm and as straight as a monument. "Mon carrosse ou et-il ?" said one of the Louis of France, when a lad, changing the

* Pronounced dee-briss, with accent on first syllable.

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gender of a feminine to a masculine noun, and masculine it has been ever since. The courtiers at once accepted the situation and the next grammar and dictionary recorded the change. Sometimes, however, fashion leads in the right direction—if there is any right direction. For instance we may assume that the Italian *a* (ah) is more pleasing or at least more dignified sound than the flat *a* of French. We are indebted to the Normans for the latter sound, and as it came over with the conqueror, why, to treat it with disrespect might imply some want of regard to the persons who brought it with them, which could not be tolerated. The sole argument for the Italian sound however, is its euphony. It is thought that *ahsk* is more euphonius than ask, fahst than fast. And so fashion decrees, we will say in Boston, the change in all that class of words, and we are expected to obey its mandates. In Philadelphia they say pa and ma (*a* as in *man*)—in New England paw and maw, and in some other places pop and the old woman. The readiness with which a foreign word is domesticated in the English language depends, first, on the want of it to express an idea not perfectly represented by any one already in the language, and, second, on the ease with which it may assimilate in its new relationship without having too much violence done to its spelling and pronunciation. We should have had *debut* and *ennui* long ago naturalized had it not been for the difficulty of deciding how to write and pronounce them. In doubtful cases the principle is a sound one that the pronunciation should be governed by the general rule and not by the exception. Although I do not consider it a case of doubt at all, yet in the word *route* there is a difference of opinion. Out of every hundred who speak the English language, perhaps one pronounces it *root* and the ninety-nine pronounce it *rout*. It may be presumed that at least three out the ninety-nine know as well as the hundredth person that *route* is a word of French origin and in Paris would be pronounced as the hundredth person pronounces it according to the French value of the vowels. The same principle is applicable to the use of the word *suite* in the phrase "suite of rooms." There can be no more propriety in saying a "sweet of rooms" than of saying a "sweet of clothes," or a basket of frweet."

There is a tendency to bring the accent as far forward in the word as possible. A few years ago not to say balcony was regarded as evidence of want of culture if not of illiteracy. Now we wonder that anybody ever pronounced it otherwise than *bal*cony. *Quandary* and *vagary* on the contrary are two words that have had the accent shoved backwards from the first to the second syllable. To illustrate the difficulty of teaching sounds by the eye alone, call to mind the pronunciation the Pennsylvanian gives to the word *barrel*, giving to the first sylla-

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ble the sound of *bar* in barter. The first syllable of the word *bury* he pronounces as we do the surname of Aaron Burr, and if you refer him to the equivalent given in Webster (berry) he says, "Yes, Webster sustains my pronunciation, b-e-r-r-y—burry." In this country where dictionaries are found in almost every house, where common schools are almost universal, there is a difference of pronunciation sufficient to indicate to the keen observer the native state of the speaker. In England there is still greater difference in the pronunciation of the mother tongue from Newcastle to Land's End. If this makes it a delicate point for one to say what is the exact pronunciation of the English language to-day, and if, as there is good reason to believe, no man living can with certainty give the pronunciation of the English language in the life time of Shakespeare, three hundred years ago, what is the probability of recovering that of the Latin language, dead for fifteen centuries, or only living in its offshoots — offshoots corrupted by ages of mental darkness, intermixed with Teutonic, Gallic, Slavic, and Arabic, and suffering violence from them all, while those who spoke them were in turn trampled under foot of Goth and Hun, and Teuton and Moor?

If the pronunciation of the Latin of the age of Augustus has been lost to earth, so has that of the Greek of the time of Alcibiades. There is a mild attempt to bulldoze the conservative portion of the United States into the new system of pronouncing Latin and Greek. Outside of the schools, the world receives the attack through the proper names of the classics. Thus the hero of my lord Beaconsfield's last novel must, as they claim, have its accent on the third syllable, End*y*mion, (although that syllable is short both in Greek and Latin) because in Greek the acute accent is placed over it. But the object of Greek accentuation is all a mystery. No one knows, except to his own satisfaction, what it means at all. It was not in use previous to the sixth or seventh century, and all tradition of its introduction has been lost. The modern Greeks employ the accent to point out the emphatic syllable, but the modern Greeks do not pretend to have the pronunciation of the classics, and would have to abandon their system to read a line of Homer according to its rhythm. Subjected to the modern system by accent, the grand old poem would be reduced to plain prose with none of that rhythmical beauty that has charmed the world for three thousand years.

ETYMOLOGIES.

And now let us turn our investigations in another direction: into discussions of word changes, etymologies, and whatever of interest may be found in the practical use of the language of our fathers. There is

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one very important fact overlooked by many writers and thinkers on the origin of our language: and that is, that the portion of words introduced by the Normans are not French words — that is, they are not taken from what is known to-day as the French language. The truth is that when the crown of Harold was placed on the brow of the Norman duke, and England portioned out among his followers, the language which they brought with them was really but one dialect struggling for supremacy with two or three others within the borders of what is now the republic of France. Although it then bade fair to take lead as did the Castilian in Spain, and the Tuscan in Italy, yet as time went on, the dialect of the Province of the Isle de Paris became the standard of the Gallic tongue. We are, then, not to look to modern French for the standard in form and pronunciation of our Gallic words, but to the old Norman French. A few words will illustrate the truth of this statement. Thus it would not be easy to explain the discrepancy between the French words *gloire* and our *glory*, *mémoire* and our *memory*, *victoire* and our *victory*, *ivoire* and our *ivory* but when we discover in the Norman writings that have come down to us from that period, that these words in that dialect took the same form as ours with the exception that in spelling they terminated in ie instead of y, the case is self-evident. The Normans said memory as we say memory. And moreover, the same termination is continued in English books down to the 17th century.— The same is true of another class of words, like honor — French *honneur*, but Norman *honor*, and later *honour* with the accent on the last syllable. And so the adjective *glorious* had the same form exactly in the Norman dialect, while it took that of *glorieux* in the French. The same may be said of *joyous hideous, courageous* and many others: perhaps all of this class of adjectives. Again we observe in old English a general disposition to spell words now ending in *ance* and *ant* with an additional u, as *graunt, chaunt, avaunt, chaunce, launce,* and even *chaumbre.* The pronunciation, however, was not affected by the *u*, and was the same probably as that we now give to these words. But this was a Norman orthography, and does not appear in the French forms of these words, neither at that date nor any time since. The appeal to the real source of the Gallic portion of our language brings in evidence to settle another disputed question of the dictionary men: shall we write *centre* or *center? Octobre* or *October?* Those ancestors of ours (if we ever had any such) who came over with the conqueror wrote these words as Webster spells them, ending in *er*, while their Isle de Paris neighbors on the east followed Worcester, who, by the way hasn't yet conformed the spelling of his own name to this rule.

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If our language had come from the upper Seine we should have had *jardin* and not *garden* as the Normans called it, and *jarret* instead of the Norman *garret*. One moral of all this is that we should be careful in giving a French pronunciation to English words, to make sure first and foremost, and not put a French coat on a lay figure of Norman extraction.

It is remarkable how the wear and tear of centuries have changed the appearance of the sonorous words of Latin to their modern dress. Thus *mea domine* of the Latin in the Italian comes to be *mia donna*, then contracted still more to one word as *madonna;* in the French it dwindles to *madame*, and in the English is successively *madam*, ma'm, mum and mem, and with a sign of affirmation is reduced to the single letter *m*, as yes'm.

In French while the eye sees a goodly framework of letters reminding one of the old Latin, yet the number of silent letters makes the word as pronounced a very feeble representative of its original. Thus the original adjective *septimus* is seen in the modern French as *septième*, but in its pronunciation, set-yem, an old Roman would hear no familiar sound to tell him what the speaker intended to say.

SLANG.

The eastern reader of Mark Twain's account of a California miner's attempt to make known his wishes to a clergyman for his services at the funeral of a comrade, would suppose that the curious slang employed by the miner was the product of the Pacific coast. It is nearly all of it, however, of English origin and older than this century. Thus the slang of one age reappears in another and sometimes works its way up to become good usage. A large class of uncouth words, such as disgruntled, bamboozle, obstropalous, flabbergasted and skimshaunter, that have been regarded by many as the outcome of Yankee humor are all words that have been used as slang in England for an indefinite number of generations. Gospel shop is thieves' slang for church, and the parson they have dubbed indifferently, snub-devil, devil-catcher, devil-driver, and tickle-text, while the parish clerk is known as the amen-curler.

In 1811 the revised edition of Grose's slang dictionary defines the word *gouge* as follows: "to squeeze out a man's eye with the thumb; a cruel practice used by the Bostonians in America." And there may be Englishmen still living who suppose that is yet a popular amusement in Beacon street. The phrase "to get one's back up," which I heard for the first time about thirteen years ago, is at least as old as the present century, and probably as old as the domestication of the cat. *Fogy*

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was the slang word in 1800 to represent an invalid or superannuated soldier. Its transition to designate any elderly person whose opinions differ from our own is of course very easy.

Housage is a word found in the deeds of sale and wills of the seventeenth century. It means more than housen, the old plural of house, inasmuch as it includes besides dwelling-houses all the out-buildings attached to a farm house.

The use of the word *prevent* to signify to precede or to anticipate is well known in few passages in the Bible. [Ps. 21:3, Matt. 17:25.] In a letter from the Rev. John Goodwin to the Rev. Thomas Goodwin, written in 1639, in regard to some theological difference of opinion, occurs the following: "The heavens, I doubt not will accord us; yet were it our greater comfort and glory, if the earth herein might prevent the heavens."

VARIOUS ETYMOLOGIES.

Jury-mast. Two derivations of this word are suggested—both from the accidental resemblance of other words to this. The first, given by Webster, is that it is an abbreviation of injury-mast. But there are two objections to this—first, the accented syllable of the original word is dropped in the derivative, which would not happen in the natural order of things; and second, the first half of the word probably comes from the same linguistic family as the second half, and *mast* belongs to the northwest of Europe, to Teuton and Scandinavian. The suggestion of Worcester (who seems to like to differ from Webster when he can) is that it is from the French word *jour* (a day) as if a mast used for a day and therefore a temporary mast. The fault of this theory consists in it ascribing the first part to another linguistic family than its mate, and in the great hiatus between the meaning of the generic word day and the specific meaning of the word temporary. Too much is taken for granted. The wisest course for us to take is to have the courage to admit that the utmost we are warranted in saying is, that so far as the facts are known they point to a Scandinavian origin of the word, and that both the thing and the name came from the Vikings of the North.

As other examples of false etymology we may take the following: *Catnip* is not so named because cats nip it, but comes from the old English word nepp or nipp, a general term for mint. Catnip then is really catmint. *Runagate* is not one who necessarily runs a toll-gate but a renegado, one who denies his faith, from *renegando religionem.* *Causeway* is not because some one has caused a way to exist where formerly there was none, but simply a paved road from the French *chaussée.* *Tuberose* is another example of gravitation and false ety-

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mology. Not because it is a rose, for it is a polyanthes and more like a lily, but it is a result of trying to Anglicize its French name *tubereuse.* When the English captured Canada and the adjacent territory, French names along the coast fared hardly when pronounced by the unlettered sailors of England, and thus *Anse des Cousins* or Bay of Mosquitos, has now become Nancy Cousins bay. *Typhoon* is generally considered to come from the Greek *typhos* — a furious storm, but it really is a Chinese word *tai-fung,* meaning a great wind.

Crank is a word which, as now used, was given to our country by an off-hand remark of a sheriff in Washington when the nation was paralyzed by a crime unparalleled for the shameful motives that led to it, and the ferocity with which it was perpetrated. It now signifies a person of not well balanced mind — whose judgments are incorrect and whose temper is such as to lead him to acts of personal violence in case his purposes are thwarted. In German it means to be sick or ill. In some dialects of the English language cranks are pains and aches and cranky means poorly. In New England and on the east end of Long Island sixty years ago it was used to express the idea of returning health after a sickness. Thus a man so circumstanced would say I am getting crank again — that is recovering his usual health and vigor. This usage is found in Howell's letters where he says: "We use the Dutch word *crank* in English to be well-disposed, which in the original signifieth to be sick." In nautical language it applied to vessels inclined to heel over — such as were too narrow and high for their width. It is from this use of the word, I presume, it came to mean what it does in the current newspapers of the day.

In 1876, bewildered by the French use of the word *exposition,* the Americans seemed to be at a loss whether their affair at Philadelphia was an exposition or an exhibition. Both names were used in the newspapers and guide-books, but the majority were in favor of calling it an exhibition, and they were quite right, as it was the English and not the French language that we were using. The French word *exhibition* denotes a single act, as to exhibit the contents of a purse. The French word *exposition* is a formal exhibition of many things to the gaze of the world. The French *exposition,* then, is the exact equivalent of the English *exhibition.*

When the thing represented by a word ceases to exist, the word dies also. Our English ancestors ground their wheat in a hand-mill called a quern — but since wind, water or steam-mills have ground the grain of the race, the quern and its name alike have both quietly dropped out of existence. So the addition of a new thing to the treasure house of the world necessitates the coining of a name to

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represent it in the world's thought. We have telegram and we still need calogram, meaning a message over a cable, or spartogram, to designate a message by cable.

Demijohn is a word which takes its present orthographic form from a tendency to make it conform to words expressing some idea to an English speaking people. As a matter of fact however, it has no relation to demi, meaning a half, nor to the common or proper word, John. It is an Arabic word in common use in Egypt, to signify a large glass bottle, inclosed in wicker work, and holding usually from one to two gallons.

Among decided Americanisms we may place the verb *nassau.* To nassau a book is to take out its plates, title-page or index, that is, as if such would be its inevitable fate if it had passed through one of the second-hand book stores of Nassau street, New York.

The etymology of the word *martinet,* meaning a strict disciplinarian is very obscure, unless we accept the derivation given by Webster that this was the name of an officer in the French army in the time of Louis XIV, who burdened his subordinates with a superabundance of discipline. The only objection to this in some minds is, that it is too simple. But every other etymology is altogether too far fetched to be accepted, and here, as often happens, the truth may lie on the surface, and the simple be the true.

There is a word whose use in this country is wide-spread but which cannot be found in any dictionary. The word as pronounced I should write *canelle.* It signifies the coarser portion left after the finer flour has passed through the sieve after grinding. Another name for this article, quite common, is *shorts.* It is probably derived from the French word *canaille,* meaning the lowest rabble of a people. But the remarkable point is that it has so long escaped the keen eyes of the dictionary men.

MENTAL GRAVITATION.

There is a curious change in the spelling of some words brought about by what we may call mental gravitation. Thus in the name of our eastern neighbor Connecticut, the middle c not only has no use or sound there, but it has no business there — the original word having no such letter. It came in by gravitation — gravitating towards our English word *connect.* The spelling of *aisle,* the aisle of a church, had a similar origin. That portion of the church was the wing of the church, and named from the Gallic *aile* a wing, as of a bird; and the superfluous *s* crept in by gravitation toward the word isle — an island — in which latter word it came through the old French *isle,* as in its Teutonic form it is without the s in all the various

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dialects of German, Dutch, Swedish and Icelandic. *Lantern* is another conspicuous example of the same. Of course we get the word direct from the French *lanterne*, but our forefathers for generations spelled it lanthorn, as if the name had some connection with the horn slabs on the sides through which glimmers its faint light. The habits of the great and good Falstaff furnished opportunity for one Shakespeare to render immortal the name of a light wine which entered so largely into the famous reckoning at the tavern, a half-penny worth of bread to seven shillings of sack. This wine was exported to Spain from Xeque, a town in Morocco, not far from the straits of Gibraltar, and from Spain found its way to England. The transition was easy to the name that was found so often coming from the lips of the doughty knight. So also the word *valance* is said by Junius, an old lexicographer, to have been borrowed and Anglicized from the Italian *valenzane*, which was derived from Valentia, the city where the article came into use and fashion.

There is or was a church in London, called the Marylebone church. It has also given its name to a street in the same city. The same authority, Junius, thinks it equivalent to Marybone and that a corruption of marrow-bones, and that designation to have originated from the kneeling posture of the worshipers. But it seems more likely to have been simply derived from *Marie la bonne*, Mary the good, meaning, of course, the Virgin mother of our lord. Marry, the exclamation so often seen in the literature of the Elizabethan period, is, of course, but a variation of the same name.

SIGNBOARDS.

Nothing is easier than to make mistakes in etymology and sometimes very curious ones. The signboards of the taverns of England have been a fruitful theme of philological guessing. Regarding them as corruptions of something lost that was more dignified, philologists have shown much ingenuity in their wrestle with these word puzzles. Thus the goat and compasses have been regarded as a relic of the pious motto "God encompasses us." But the truth is, the sign was addressed very largely to the illiterate, and the more grotesque it was — the more incongruous the objects associated — the more likely it would attract attention. Thus the one mentioned — what has a goat to do with compasses? He is neither carpenter, cooper nor philosopher, though he hath a long beard. But the name once heard could never be forgotten, and that was reason enough for its adoption. The Cat and Fiddle is another instance. The cat suggests cosiness, comfort, and the fiddle tells of merriment. The combination flows from the lips like water, and

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whoever has heard nursery rhymes has become familiar with cats that fiddle as well as stride in boots. But there are some men who think they dive deeper into the wells of knowledge than their fellows and such as these suggest that the Cat and Fiddle is a corruption of the *Chat Fidèle.* But the faithful cat has no point or significance whatever. There are no faithful cats. The Bell and Savage is another attractive incongruity. What does a savage want of a bell? While it was calling him to dinner, it would be frightening away his supper or his next dinner. But some philologist thinks the origin of this sign is the *belle sauvage,* which might be allowed if London innkeepers were in the habit of attracting custom by exhibiting on their sign boards French rebuses to be read by Englishmen who could not even read their own vernacular.

In reading a novel by Mortimer Collins a few years ago, I was startled by meeting the phrase "necoteric kettledrum." Necoteric kettledrum! what could it mean? Well, I went to the dictionaries — but they furnished no assistance. Necoteric, at least, had a Greek look about it — so I turned to my Greek lexicon. And there it was — or its root rather, for the full developed adjective is not in the Greek language, and was coined from the author's own mint. Necos - - that is strife — and necoteric, of course, is strife-stirring. The strife-stirring kettledrum! And I laughed as I realized what a fine classic euphemism our author had invented for what the ladies on the east end of Long Island would term an old-fashioned tea-fight.

The Chinese are thought to exceed other nations in national self-esteem and in the application of uncomplimentary epithets to foreigners. And yet the English were not backward in this habit as is evident from these phrases in vogue in 1800:

Dutch comfort.—Thank God it is no worse.

Dutch concert.—Where each one plays or sings a different tune.

Dutch feast.—Where the host gets drunk before his guest.

French leave.—To go off without paying one's debts.

Spanish coin.—Fair words and compliments only.

Spanish faggot.—The sun. As if the Spaniard were too lazy to gather faggots or too poor to buy them.

Spanish trumpet.—The braying of an ass.

Irish apricots.—Potatoes.

Family names suffer violence in the vicissitudes of migration and the ferment of peopling and reducing to civilization the wilderness of a new country. Thus the French De Bœudereau has been gradually worn down to Budrow. Le Sieur has changed to Lesier. Vermeille to Vermilye. The Dutch Kiersen has been reduced to Keese and Keys and Oblinus has been hibernicized to O'Blenis,

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and Michiels to McKeel. Cornelis, another Dutch name, has taken the form of Cornell. But this name Cornell was also sometimes written in the seventeenth century Cornhill as if of English extraction. Kirkpatrick originally was a Scotch name. When some of the members of the family emigrated to Ireland their name shaded off into Kilpatrick and Gilpatrick. Members of the same family emigrating to America suffered the name to undergo still further changes, by dropping either the first or last portion of the name. So that we have here Kirkes, Patricks, Kirkpatricks, Kilpatricks and Gilpatricks, all claiming descent from the same Scottish ancestor.

The truth is, the language is never stationary. Like those who use it, it is in a state of progress. In the time of Chaucer and before him what is now the silent *e* at the end of such words as *home* and *name* was pronounced as a second syllable. During the lifetime of this poet it began to be dropped in common speech, thus making one less syllable wherever it occurred. Life was too short to tolerate useless excrescences and they were lopped off. Thus have we shorn off one after another the inflectional termination of nouns and adjectives and verbs and find the simple root form answers all our necessities, with the aid of prepositions for the nouns and auxiliaries for the verbs. In the eliminiation of the useless we have far outstripped the French and the German — taking these two as representatives of the Latin and Teutonic languages of modern times. For illustrating the absurdities of the law of gender in the German language see the story of the fishwoman in that English classic, "A Tramp Abroad," by Mark Twain. Their declensions of nouns and adjectives are also so peculiar, that scarcely any two writers of a German grammar ever agree upon a common system and a common nomenclature.

The same criticism applies to the application of gender to inanimate objects in the French language, but the case terminations of the Latin parent tongue have been worn away in the French by the attrition of ages. In that respect it resembles the English of the present. There is no language used by the civilized world so point blank as the English; none in which an idea may be as easily and fully formulated, without circumlocution or redundancy. And to-day by the use of the English language one can convey a message of a given number of ideas in fewer words than by any of the modern languages of Europe. It is like a strong man stripped to run a race. It is equal to any in precision and flexibility, and there is a future for it far exceeding anything of the past.

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GRAVESTONES:

ESTHETICALLY AND ETHICALLY CONSIDERED.

By Irving Browne.

[Read before the Albany Institute, June 29, 1880.]

Our Puritan forefathers cared little to assuage the natural terrors of death. Indeed, one is almost disposed to think that they deemed it a solemn duty to enhance them. At all events, their neglect of the resting-places of their dead was well fitted to make one content to live. A New England burying-ground, even thirty or forty years ago, was the most neglected spot in the village. The thought of being laid away in such a place added a new terror to death, almost as keen as the little man's threat to the great man that he would write his biography if he survived him. The graveyard was always placed where nothing would grow, and the only cultivation it ever received was the digging of an occasional grave. The ground was usually given by some citizen, who had found, by experiment, that he could not raise any thing on it, and wanted to escape taxation for it. Its unsightly growth of weeds and grass, its ruinous fences or tumbling walls, its gravestones pitched in every direction by the assaults of the elements and the vaulting ambition of schoolboys, all combined to make it repulsive. Every thing like decency in the care of it was regarded as a squandering of money, if not rather irreligious. Any suggestion of improvement met with small favor. God's acre was left to the exclusive care of the proprietor.

It is related of the late lamented Commodore Fisk, that when appealed to for a subscription to rebuild the fence around the burying-ground in his native town, he declined, saying that he thought it was a useless outlay; those who were inside couldn't get out, and those who were outside didn't want to get in. This was the feeling of the whole community, though probably few could give so plausible a reason for it.

In New England literature, we get two noteworthy descriptions of the burying-grounds of that country. In "Twice-Told Tales"—"Chippings with a Chisel"—Hawthorne says:

"In my walks through the burial-ground of Edgartown — where the dead have laid so long that the soil, once enriched by their decay, has returned to its original barrenness — in that ancient burial-ground I have noticed much variety of monumental sculpture. The elder stones,

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dated a century back, or more, have borders elaborate, carved with flowers and are adorned with a multiplicity of death's heads, cross-bones, scythes, hour-glasses and other lugubrious emblems of mortality, with here and there a winged cherub to direct the mourner's spirit upward. These productions of gothic taste must have been quite beyond the colonial skill of the day, and were probably carved in London, and brought across the ocean to commemorate the defunct worthies of this lonely isle. The more recent monuments are mere slabs of slate in the ordinary style without any superfluous flourishes to set off the bald inscriptions. But others — and those far the most impressive, both to my taste and feelings — were roughly hewn from the gray rocks of the island, evidently by the unskilled hands of surviving friends and relatives. On some there were merely the initials of a name; some were inscribed with misspelt prose or rhyme in deep letters, which the moss and wintry rain of many years had not been able to obliterate. These, these were graves where loved ones slept! It is an old theme of satire, the falsehood and vanity of monumental eulogies; but when affection and sorrow grave the letters with their own painful labor, then we may be sure that they copy from the record on their hearts."

And in Judd's almost forgotten but powerful novel, "Margaret," we read:

"This spot, chosen and consecrated by the original colonists, and used for its present purpose more than a century, was conspicuous both for its elevation and its sterility. A sandy soil nourished the yellow orchard grass that waved ghost-like from the mounds, and filled all the intervals and the paths. No verdure, neither flower, shrub nor tree, contributed to the agreeableness of the grounds, nor was the bleak desolation disturbed by many works of art. There were two marble shafts, a table of red sandstone, several very old head-stones of similar materials, and more modern ones of slate. But here lay the fathers, and there too must the children of the town ere long be gathered, and it was a place of solemn feeling to all."

In the reaction against Puritan asceticism, it is possible that in our burying-grounds we are in danger of going to the opposite extreme, and of detracting from the proper dignity of the place by making it too much a theater for artistic display. In modern practice, the cemetery is the pleasure-ground and park of the locality. It has the finest site, the greatest abundance and variety of trees, the best roads, the most picturesque lakes and water falls, the handsomest bridges, the most inviting lodges and summer-houses, and every thing is contrived to make us forget death. In short, the cemetery is now the perfection of landscape gardening. In the midst of the beauties of natural scenery, skillfully enhanced by art, it seems essential that the few objects designed to mark the proper use and purpose of the place should be regulated by good taste and correct principles of art; and that the cultivated sense should not be shocked by obtrusive and inartistic

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erections that almost make one sigh for the huckleberry bushes of the New England graveyard of old time.

Let me offer a few practical suggestions about grave stones, or mortuary monuments, restricted to out-door monuments of private individuals.

The first point to be settled in the selection of a gravestone is the material. In this regard, durability is the main requirement. Here there is not much room for choice, for our climate imposes strict limitations in this matter. Ours is not, so to speak, an "out-of-doors" climate. A material which would be proper in the sunny clime of Italy would soon become impaired under our own stormy sky. Experience has shown that white marble will not answer in our climate. It soon becomes stained and defaced, and unless constantly scoured, like Aladdin's lamp or Mr. Stewart's house, it quickly loses its characteristic purity and beauty. Besides, it looks too cold under our cool sky, and when the earth is covered with snow, the whitest marble looks dirty. Sandstone is too friable, and yields too readily to the disintegrating influences of the weather. This has been proved by its use for many years in this country. The sandstone obelisks transported from Egypt to Europe have already, it is said, suffered much loss of sharpness of outline in their hieroglyphics. Nature has provided in every climate the material best adapted to the local architecture. The Carrara quarries of Italy and the sandstone quarries of Egypt furnish the materials best fitted for those countries, and in our land we need look not beyond the granite hills of New England. Granite seems on all accounts our best resource for mural monuments, not only for its superior durability, but because it is capable of a brilliant and lasting polish. Bronze is a very beautiful and durable material, but it can appropriately be used only in large forms, and is intrinsically, as well as for this reason, very costly. Modern use has conformed to the evident necessity of the case, and granite is now almost the only material from which out-door monuments are constructed. In respect to color, good taste banishes every thing like variety from our graveyards, but a pleasing and good effect is produced by intermixing, with certain shapes of granite, our blue limestone, or the red Scotch granite, which takes a beautiful polish. The proper use of the Scotch granite is in combination, and not by itself, for an isolated shaft of Scotch granite looks painfully like cheap pottery. It has occurred to me that in the use of red granite a good effect might be attained by rough dressing and smooth dressing in combination with polished surfaces, which mode of treatment is so effective in the gray granite. A pleasing combination may also be effected by the combination of the light Concord

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with the dark Quincy granite. It is difficult to imagine what could have induced the adoption of those streaked and variegated cheap marbles which are sometimes seen in our older cemeteries, and which so strongly reminds one of that soap which prevails in country inns or of those ingenious monuments of soap which were common in the Philadelphia exposition. The use of colored glazed tiles in out-door monuments is of doubtful propriety, as well in point of durability as in point of color. It is to be noted that the Quincy granite is unfit for receiving inscriptions, as its dark color renders them nearly illegible, and necessitates the use of paint or gilding, both of which are perishable and unpleasant to the eye.

In regard to construction, it may be observed that in addition to the evident necessity of a deep foundation, below the frost line, there should be as few joints as possible, and these should be horizontal rather than perpendicular, in order the better to resist the effect of the elements. For the same reason, the joints should be overlapped as much as possible. Owing to these laws, the use of tiles is objectionable in point of durability; the frost and the wet are quite apt to displace them.

It is evident from these limitations of material and color that the main resource of the designer must be in form. The cardinal rule as to form is that it shall be simple and severe. To my own taste, intricate carving and tracery, the elaborate gothic forms, are out of place in a burial-ground. This is not the place for the display of dexterity in handling or skill in constructing. The forms should not be so attractive as to engross the attention for the art's sake, nor so delicate and slender as to become the prey of the elements. Probably the Candé monument in Greenwood cemetery is popularly admired, but to me it is one of the most repulsive of monuments, in respect to form, saying nothing of durability. It is a sort of a sugar-candy order of architecture that is more appropriate to a confectioner's window than to a cemetery, but is not so much to be wondered at when we remember that it was executed after a design by the young lady herself.

I think it may be laid down as a rule of good taste that the principal lines of a monument should be few, straight and compact. As durability is the chief requisite, it can best be attained by simplicity and solidity. Of course there may be well rounded and curved surfaces, but they should be subordinate. Curved or concave lines in a shaft, excepting as flutings of a column, are entirely wrong, just as they are in a tower, or would be in the wall of a house. Any thing like pagoda architecture should be avoided. The lines of a shaft may

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be converging or parallel, but the ascent should be decisive, not hesitating. The pure obelisk is always grateful to the sense, and the idea of ascent is best attained by isolation; a single shaft is better than a number of pinnacles. It is probably the gratefulness of this feeling of ascent that dictates that the principal lines should be perpendicular rather than horizontal. The spirit is not elevated by the contemplation of a low horizontal structure. And yet I do not deny that much has of late been accomplished in the use of horizontal lines, rising to a moderate height. Indeed, I think some of the most beautiful monuments in our modern cemeteries are in this form. But if this form is adopted, it should be in large and solid blocks. Nothing is more offensive than a slab laid on the earth, or mounted on legs like a table. It must always be borne in mind, however, that large horizontal surfaces require more care and are less durable than perpendicular structures. The slabs in old graveyards, overgrown with moss, grimy with dirt, and with their inscriptions obscured, are disheartening objects. The use of the horizontal form, too, should always be sincere; it should never seem to be what it is not, as for example a sarcophagus. Literally, there is nothing in such an object. It does not even indicate a like object hidden under ground, and if it did, it would be all the more offensive to good taste.

Mortuary chapels should be marked by simplicity. The mortuary chapel in the Troy cemetery is a model of this kind of erection, in every point of view—materials, color, form and expense. It presents a refreshing contrast to a very elaborate and pretentious chapel in the Cincinnati cemetery.

In regard to columns I must say that except in combination with a structure, I think they are not in the best taste for monuments. A column is properly an integral part of a building. It supports something. But a column standing alone suggests nothing but ruin or incompleteness, and on esthetic grounds these ideas are not to be tolerated in a cemetery. However it may be in human estimation, I suppose in the divine eye the life of man is always complete, or if ruinous, it is man's own fault, and attention should not be invited to that failure. Incompleteness in the human sense is not ruin. The idea of discontent or repining should never be represented in a monument. Rather the expression should be of submission, faith, aspiration. So the broken columns, which used to be so common, are not esthetically commendable, it seems to me. I once saw the use of the column singularly debased—I think it was in Greenwood—where three columns, broken off at different heights, were used to indicate the different ages of deceased members of one family.

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At all events the column must not be adopted as a support for any thing foreign to its natural use, such as a cross, a statue, or any of those ornamental bird-cage devices, so common in modern Italian monuments. The sense of congruity is shocked by the Christian cross on the top of a pagan column, especially when placed, as I have seen it, on the top of an Ionic column, with its capital of rams'-horns, the imitation or suggestion of Jupiter's locks. A statue on a column is always abominable in an artistic view, both from the sense of insecurity and of excessive remoteness. The Nelson monument, at London, and the Washington monument, at Baltimore, are the time-honored jest of the artistic world. I cannot conceive a case where a statue on a column could have any significance as a mortuary monument, unless it were a memorial of St. Simeon Stylites, who lived constantly for fifty-six years on the top of a pillar, "elevated in height as the Saint drew nearer Heaven and to perfection."

In regard to the use of statuary in out-door monuments, if it is permissible in an esthetic view, of which I have some question, it must be conceded that granite, the only fit and not over-costly material for our climate, is very illy-adapted to statuary. In the very best treatment of which it is capable, its lines are always harsh, both in facial expression and in drapery. As to marble, it must be said that unless a statue is more meritorious as a product of art, that can proceed from any place but an artist's studio, we can well afford to dispense with it in our cemeteries. The statuary of the average gravestone manufacturer is quite detestable. Respectable statuary, like respectable poetry, is unendurable. A pure and high work of the imagination, like Palmer's Angel at the Sepulchre, at the Albany cemetery, is exceptional, and outside the rule which we would lay down for the exclusion of statuary from the cemetery. The same may be said of the exquisite bronze ideal figure in the Troy cemetery. It may be superfluous to remark, that the use of statuary in mortuary monuments should always be emblematic or ideal; any thing like portraiture in a graveyard is not to be tolerated for an instant. The busts or statues of private men are of little contemporary interest, save to their families, and of none at all to general posterity. Let their effigies be preserved at home like the Roman household gods. A shocking display of family portraiture in a grave yard is found in one of the most expensive monuments in this country, in central New York, where life-size *statues* of the widow and daughter are weeping over the *bust* of a departed husband and father, all under a great glass case.

Even a portrait statue of a public man is better placed in a more public and common situation. The proper place for our conven-

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tional soldier's monument in the form of a statue is a public square or park, where it may constantly appeal to the busy passers. Boston has recognized the force of this idea, by placing the statues of her great public men in her public gardens and the grounds of her public buildings, rather than at Mount Auburn. I will make one exception to this rule; a mortuary chapel in a cemetery is an appropriate place for a bust or statue of a public man who is there interred. But this exception extends only to public men. The public are not supposed to care for the effigies of private persons, and any parade of them is objectionable. In the cemetery at Cooperstown, overlooking Otsego lake and the village founded by his ancestors, is a monument in memory of Cooper, the novelist, surmounted by an ideal statue of Leatherstocking, the hero of so many of his romances. This is a good example of the proper employment of ideal statuary in the burying-ground, and although a monument to a public man, is properly placed in the peculiar circumstances. If my memory serves me rightly, the statue is supported by a column, which is objectionable for the reasons I have mentioned.

It is a fundamental canon of art, that mere imitation of cheap, common, and ephemeral objects and materials should be eschewed. This law is applicable to the adornment of cemeteries. To illustrate this idea: a heap of stones, with a rude, wooden, bark-covered cross, thrust into it, and the whole overgrown with vines, under certain circumstances is a touching and appropriate memorial, but certainly not where any thing more dignified or more durable can be afforded. But the imitation in stone of such a monument — a very common imitation — is entirely indefensible by the laws of art. The more skillful the imitation in such a monument, the worse the art. It is insincere and unworthy — insincere because it expresses a poverty which it does not suffer, and unworthy because it calls attention simply to the dexterousness of the art. There are of course instances in which a common object has acquired an emblematic use, and may therefore be properly imitated in stone, as for example, the anchor, the Christian emblem of hope. But such use should generally be strictly emblematic. Any attempt to use such an emblematic form to signify the occupation of the tenant of the grave or the manner of his death is ordinarily vulgar. And where the emblem is adopted, the imitation should be confessed; we must not use the real thing. For example, we could not tolerate an iron anchor on a monument. Still less could we endure even the imitation of an anchor over the grave of a manufacturer of anchors. Occasionally, where the occupation or the manner of death was one that was essentially noble or heroic, or appeals

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to our higher sympathies, such an adaptation may be tolerated. Thus I see nothing incongruous or inartistic in the adoption of the anchor for the monument of a seafaring man, on account of its religious symbolism, but I have some doubt about the artistic propriety of adding the cable and capstan, which simply designate the man's business in life. In fact, any thing commemorating the commercial occupation of the tenant of the grave can serve no purpose save to indicate that the old business is still carried on at the old stand by the sorrowing survivors. For example, on the monument of an expressman at Mt. Auburn, bas-reliefs depicting the *modus operandi* of the express business, such as a horse and wagon at full speed, and a big dog guarding a safe, do not raise devout emotions in the spectator. I once saw at the grave of a sea-captain, in Springfield, Mass., a dismasted ship on her beam ends in the grass, carved out of stone. Whether this was intended also to signify that the deceased had been lost at sea, I do not know, but it seems hardly artistic, as the representation of a ship cast away in the grass calls up no sensation of terror or sympathy in the beholder. In myself it excited quite a different sensation. It made me think of the story of the canal boatman, who was narrating the circumstance of a wreck on the "raging canal," in which the noble vessel went down, and every soul on board perished save himself. "But how did you escape?" was the inquiry. "Well," said he, "I see how things was goin', and so I took my boots and stepped ashore." Now a monument that can suggest such an undignified reminiscence can hardly be artistically right. It is possible that such representations in the form of bas-reliefs on the surface of the monument may be permissible, but when they are made to assume an independent attractiveness, they lose their place. The famous "hay-stack" monument, at Williamstown, Mass., is an example of the mingling of good and bad taste in this particular. This monument is built to commemorate the origin of the American Foreign Missionary system, on the spot where it was devised. The tradition runs that the projectors were in the habit of sitting under a hay-stack on this spot, and counselling together. So we have a hay-stack chiselled in relief on the side of the shaft. It might be taken for a projectile for a rifled canon, or for a Dutch cheese. What pertinency it has, unless to suggest that all flesh is grass, I cannot imagine. On the top of the shaft is a massive globe, designed to represent the world, with continents and islands faintly outlined on it. This is not so bad, but it would be better if the literalism of the outlines had been omitted. It is a wonder that the designer did not paint the heathen parts of the world in black. But let us be thankful that the hay-stack was not put on top instead

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of the globe. An example of a monument representing the manner of an heroic death is found in the famous firemen's monument at Greenwood — the statue of a fireman with a rescued child in his arms. I am not aware whether this represents an actual and particular occurrence, or is typical merely, and placed over the graves of brave firemen who have lost their lives in the performance of duty. This is an instance so strongly appealing to the best sympathies of our nature, that the idea adopted is entirely right; but it may be questioned whether it would not be better expressed in a high bas-relief. A most offensive example of the imitation of common and prosaic things, I once saw in a representation of a baby's worn pair of shoes chiselled on a gravestone. Nothing could be worse than this — but the real article, and that I once saw in a glass case on the top of a gravestone in a country burying-ground. The imitation of animal life on gravestones is usually prohibited by good art, even when designed to be emblematic. Let all the sentimental lambs be put into some other pasture than the graveyard. Sentiment is admirable, but sentimentality is sadly misplaced there. And do not let us have any doves and little boys on ponies. An exception to this rule exists in the case of monuments to public heroes, as for example the famous lion at Lucerne, commemorating the devoted Swiss Guard who perished in defense of Louis XVI, and a most touching example in the Troy cemetery, where, at General Thomas' tomb, the eagle guards the patriot hero's sword. We have outlived the conventional weeping willow, and I hope, the broken flower and the broken rose-bud also. I am tired of broken rose-buds, but in the contemplation of a canker-worm gnawing off a rose-stem, on a monument at Newburyport, I experienced a more uncomfortable feeling than fatigue.

Our forefathers used alternately to terrify the survivor with skull and cross-bones, and enchant him with a cherub's head at the top of the gravestones, both usually equally terrific, by the way. All objects simply suggestive of death or decay should be ostracised. Of the sarcophagus I have spoken. Urns, I am glad to observe, have pretty much gone out of vogue, and the pall has had its day. Nothing more incongruous can be conceived than an urn in a Christian burying-ground, for cremation was a heathen custom, and if it should be reinstated in favor, there would be no use for monuments except as receptacles for the urns, in which case the urn would no longer be in sight. It is a pretty safe rule to dispense with all sorts of natural and artificial objects in the ornamentation of tombstones. Of course the rule, like every other, has its exceptions, but like all other exceptions they simply tend to confirm the rule. The objection to such things

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is that they are apt to degenerate into sentimentality. Conventional objects and emblems may be indulged in, but they should be evidently appropriate and in harmony with our religion. I even think that the pagan butterfly would be more appropriate than a lamb over the grave of a child, for although the latter is the emblem of innocence, it may occasionally, in spite of the proverb that the good die young, find a place over a particularly terrible child, and so lose the advantage of truth; but the butterfly is the classic emblem of immortality and resurrection, and so is always appropriate. But it is quite safe to leave off such things. Again, all devices which simply draw attention to the personality of the deceased are inappropriate at the grave. For example, although every monument should exhibit the surname and the several christened names, what is the use of parading in addition the monogram of the head of the family? This is too much like the stationer's art, and makes one think of "no cards." The only monogram that I ever saw on a monument that is tolerable is one composed of alpha and omega. But no monogram, or any other device, ever ought to be cut on the shaft. For the same reason, I think coats of arms are objectionable. The graveyard is no place for the "boast of heraldry." Reserve them for carriages and plate. Besides being misplaced, they are in this country generally as false as epitaphs themselves. I have objected to portraiture. Occasionally I have seen medallions of the deceased on monuments, but it seems to me they are not in correct taste. The monument is designed to mark the resting place, and to perpetuate the memory, not the face or figure. Why should we struggle to preserve for the public gaze what God has decreed to perish? Banish such memorials to county histories. Let the perpetuation of the form exist in memory alone, so far as the monument is concerned. Another advantage in this course; imagination may convey to the stranger and to posterity a more favorable idea of the physiognomy than portraiture would do. A good many years ago there was a fashion in New England, in rural districts, of inserting a daguerreotype of the departed in the upper part of the gravestone! I suppose this ridiculous custom no longer obtains, but except in dignity of material and excellence of execution, it is only less absurd than carving a portrait medallion in the same place.

But if there is any thing better deserving the prize for offensiveness than all others, it is any indication of an assumption that the tenant of the grave is a partaker of the glory reserved for the saints. Expressions of hope and trust in this regard are all well, but we ought to be a little modest about taking it for granted. A hand with an index finger pointing upward is a common example of what I mean. There

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is a vast amount of assumption in this sort of device, and in regarding the gravestones of certain persons whom I have known, I have thought that an asterisk would more correctly direct the thought. Now I never see this upward pointing index finger without being reminded of a certain story, and as it was told me by a clergyman there can certainly be no harm in my repeating it. In certain localities in New England they have shops where they manufacture and keep on hand for sale a stock of ready made gravestones with devices, inscriptions and epitaphs suited to every occasion, and only lacking the particular data, which are filled in to order. A farmer who had been deprived of his wife by death, wishing to show proper respect to her memory, and also to save time, asked a neighbor who was driving to market, to go to a shop of this description, and select for him a handsome headstone for his wife, and at the same time gave him the necessary data for completing the inscription. The neighbor performed the errand, and in due course of time the stone was sent home executed in the first style of the art, with a touching epitaph about "mother" at the bottom, and at the top a hand with the index finger pointing upward, and under it the words "no graves there," all very appropriate apparently. But somehow it did not seem quite to suit the purchaser, for the fact was that his surname and consequently that of his deceased wife, was — Graves! Prophetically, as well as historically, it probably had an unpleasant significance.

As to inscriptions they form a fertile subject of themselves, and are hardly within our province, but I may be allowed to offer one suggestion — eschew conventionality and pedantry. Conventionality is always unpleasant, but when associated with an affectation of learning it becomes ridiculous. "*Mors janua vitæ*" has been carved over many a grave, but to me, it now only serves one purpose, and that is to remind me of an anecdote of Lord Kenyon, who was always quoting Latin incorrectly, and was very parsimonious. When his lordship died, "*mors janua vita*" was displayed on the hatchment. This served to emphasize his pedantry and his ignorance, but a wag of a lawyer insisted that the misspelling was intentional on his lordship's part in order to save the expense of the diphthong!

Every object in a Christian burying ground ought to be consonant with the Christian faith. It is for this reason, in part, that urns are out of place there. The same idea would exclude every thing like imitation of distinctively pagan forms of architecture, unless they have received the Christian sanction by use. I suppose the use of vaults will always be retained by those who shrink from bowing to the divine decree of "dust to dust," but if we are to have vaults, let us

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not have them in pagan forms. For example, let us not construct a vault in the form of an Egyptian tomb with the exterior symbols of that religion. A Greek temple is not so incongruous, because we have to some extent adopted Greek architecture in our religious edifices; but a Greek temple was not a place of sepulture, and we have better resources than either of these anachronisms. Standing the other day in Mt. Auburn, I saw a monument in the form of a sphynx, commemorating the downfall of slavery and the suppression of the rebellion. But why a sphynx? It has no significance as a memorial of those who perished in the war, for christianity will not admit that their fate involves any riddle. Possibly, however, it may convey a hint of the riddle of political reconstruction, or the unvarying silence of the great man who commanded our armies.

It remains to speak of a matter only indirectly connected with my subject, but of prime importance in any consideration of it, and that is, the cost of graveyard memorials. The expense of modern funerals has assumed such burdensome proportions as to call forth a protest from the clergy of many places, and the same excessive luxury and display have been carried into our cemeteries.

Some men are never content in life unless they lift the eaves of their dwellings above their neighbors' houses; and among such there seems to be a sort of posthumous contest for the tallest and most costly monuments. I have said that all mortuary monuments should be simple and severe. Ostentation is horribly vulgar, as mere matter of esthetics in a cemetery, which ought to be the most democratic and levelling place on earth. Do the best we may in point of plainness and economy, such memorials will cost enough. A fashionable gravestone designer can command his own prices. I have now in mind a monument not very large, and by no means elaborate, which is said to have cost $10,000, or as much as a good dwelling-house with all the "modern improvements." The profit on such an erection must be enormous. How insignificant in every point of view is that monument when compared with one erected by the same person at half the expense, in the form of a bequest for a historical alcove in a public library. Better to have reversed the application of the two amounts.

Now I suppose a single individual has a legal right to erect a monument, costing $10,000 or $50,000, but I very much doubt whether he has any moral right to do it. Expenditure beyond a modest sum in this direction does no good. It does not educate like a school or a college; it does not cultivate like a gallery of art; it does not shelter like an asylum; it does not heal like a hospital; it does

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not redeem and inspire like a church. Almost under the shadow of pretentious monuments, families are starving and freezing. If God has given a man abundance of this world's goods, and he wishes to erect a monument to himself, let him build in charity, in religion, in love, and let him attach his name to the donation, if he is in dread of being forgotten, but do not let him heap up a pile in the cemetery, which will only call attention to his vanity and selfishness, and frequently to his smallness. I have noticed that the size and cost of mortuary monuments are generally in inverse proportion to the moral and intellectual worth of the builder. A man who made a fortune in pills or petroleum will cause a chapel to be erected over his grave, which will cost more money than Milton, Michael Angelo and Beethoven got for all their works. It is not for all to fulfill the Roman poet's boast, that he would build for himself a monument more lasting than brass. It is not of every one that posterity will say, as it says of the architect of St. Paul's, "If you seek his monument, look about you." Nor will the most lavish outlay on our part preserve our monuments or our memory. The most magnificent monument ever erected, that of Mausolus, King of Caria, which was one of the seven wonders of the world, has long since disappeared, and "Mausoleum" calls up no suggestion of the origin of the word or image of the monument. To whose memory were the Pyramids erected? In contemplating the Castle of St. Angelo, we forget that it was the mausoleum of the Emperor Hadrian. The tomb of Cecilia Metalla survives two thousand years of Roman history; but the poet Byron, at the close of five magnificent stanzas devoted to conjecture upon the woman in whose memory the grand pile was erected, can only say:

> "But whither would conjecture stray?
> Thus much alone we know, Metalla died,
> The wealthiest Roman's wife; behold his love or pride!"

On the other hand the mound of Marathon is imperishable, and so is the deed which it commemorates. The simple slab on Bunker Hill, inscribed "Here Warren fell," is more attractive to the pilgrim than the towering obelisk under whose shadow it lies. What monument more touching than the little flag which a grateful country annually plants on the graves of the heroes and patriots who died that we might live? In the Troy cemetery has recently been erected the hugest monolith of modern times, at an outlay of $50,000, over the grave of General Wool, a man who it is safe to say will not loom up in very large proportions in historical perspective. In contrast with this is a

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modest, low headstone, almost hidden in the grass, in the old Concord burying-ground, bearing no inscription but a name — but that name, the greatest in American literature — Hawthorne. That unique genius probably put his own sentiments into Miriam's mouth; at all events a wholesome and weighty sentiment — when he made her say:

"It is a good state of mind for mortal man, when he is content to leave no more definite memorial than the grass, which will sprout kindly and speedily over his grave, if we do not make the spot barren with marble. Methinks, too, it will be a fresher and better world, when it flings off this great burden of stony memories, which the ages have deemed it a piety to heap upon its back."

At Arqua are the mansion and sepulchre of Petrarch, of which the poet sings:

"* * * Both plain
And venerably simple, such as raise
A feeling more accordant with his strain
Than if a pyramid formed his monumental fame."

If one would have his memory "smell sweet and blossom in the dust," he must build for others, not for himself. Otherwise he will share the common fate — to be forgotten. A great or sweet life needs no care on the part of him who lived it. What will signify those gleaming masses on the wooded heights to him who shall sail up the Hudson a hundred years hence? But the public charities founded by those who slumber there will endure, and bless like the twice-blessed attribute of mercy.

"Such graves as these are pilgrim shrines;
Shrines to no code or creed confined;
The Delphian vales, the Palestines,
The Meccas of the Mind."

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AMERICAN ENGLISH.

By Gilbert M. Tucker.

[Read before the Albany Institute, June 6, 1882.]

And you may have a pretty considerable good sort of a feeble notion that it don't fit nohow; and that it ain't calculated to make you smart overmuch; and that you don't feel 'special bright, and by no means first-rate, and not at all tonguey; and that, however rowdy you may be by natur', it does use you up com-plete, and that's a fact; and makes you quake considerable, and disposed toe damn the engine!—All of which phrases, I beg to add, are pure Americanisms of the first water."—*Charles Dickens, Letter to John Forster, February*, 1842.

The time-honored jokes about the "American language," if not entirely antiquated, have at least for the most part changed their longitude to a meridian considerably east of that of Greenwich. A recent attempt dates from the land of the Pharaohs. Riaz Pacha, late President of the Egyptian Council, is said to have retorted, on being rallied by an American for supporting so patiently the British yoke, that in one respect at least the English were making greater progress in the United States than in the East, inasmuch as he was credibly informed that their language was now almost universally spoken among the Americans! This is perhaps endurable; but it would subject one's politeness to a pretty severe strain, now-a-days, to be expected to appear greatly amused at a story about compliments paid in Great Britain to the good English spoken by some exceptional traveler from New York or Boston. Serious references, moreover, like that of Dean Alford, to "the process of deterioration which our Queen's English has undergone at the hands of the Americans,"* are not often found in British publications of very recent date, except when accompanied (as was the dean's) by some display of insular prejudice or crass ignorance in regard to the history, geography or politics of the United States, such as would naturally disqualify the writer, in the mind of an impartial judge, as a critic of anything pertaining to this country. The testimony of well-informed British writers of the present day is, in fact, more generally in accord with that of Sir George Campbell: "Of the body of the [American] people it may be said that their language is a little better than that used in any county of England."†

Yet the pages of so important a periodical as the London *Nineteenth*

*The Queen's English, 11th thousand, ¶8.

†"White and Black."

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Century gave place not long ago* to an article, by Mr. Fitzedward Hall, in which it is gravely, as well as elegantly, stated that William Cullen Bryant lived "among a people among whom our language is daily becoming more and more depraved," and that whoever compares the diction of "Edgar Huntly," a forgotten novel published in 1799, with Mr. Bryant's letters, "the English of which is not much worse than that of ninety-nine out of every hundred of his college-bred compatriots, will very soon become aware to what degree the art of writing our language has declined among educated" people in the United States!

That such rubbish should be written by a recognized authority in philology ceases to be surprising when it is understood that the author is—not a Briton, as might be supposed, but one of those extraordinary Americans of the Henry James, Jr., stripe who seem to regard it rather as matter of regret than otherwise that they were not born in Europe.† Yet that the editor of such a magazine as that in which this effusion appeared should think it worth while to print and presumably to pay for it, is a phenomenon which suggests two interesting reflections. The first, of comparatively minor importance, is merely that our English cousins have a good deal yet to learn about our common language as used in the two countries. The second is, that where there is so much smoke there must be some flame. That is, making all allowances, there must really exist certain noticeable variations between the styles of writing and speaking that are current on the opposite sides of the Atlantic; for if no differences at all could be found, it is hardly probable that an intelligent man, however strongly British his prepossessions, would care to publish a dissertation in which our practice is deliberately set down as distinctly inferior to that of his own nation. In what these differences consist, and in what particulars the mother tongue may be thought to have become especially "depraved" in this country, are questions deserving attention.

I.

In the first place, it will hardly be denied in any quarter that the speech of the United States is quite unlike that of Great Britain in

*Issue of September, 1880.

† Or he may remind some readers of "Mr. Carroll Gansevoort" in Edgar Fawcett's bright story, "A Gentleman of Leisure." Mr. Gansevoort, a New Yorker by birth, who "would consider himself disgraced if he wore a pair of trousers or carried an umbrella that was not of English make," rebukes a friend for committing the frightful Americanism of saying that he fished with a pole (instead of a rod), and upon the culprit's perpetrating the further enormity of speaking of catching four dozen fine trout, remarks: "Upon my word, I beg your pardon, old fellow, but it always amuses them so on the other side when we speak about *catching* fish. There they don't catch them, you know; they kill them!'

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the important particular that *we have no dialects.* "I never found any difficulty in understanding an American speaker," writes the historian Freeman;* "but I have often found it difficult to understand * * * a northern-English speaker." Trifling variations in pronunciation, and in the use of a few particular words, certainly exist in this country. The Yankee "expects" or "calculates," while the Virginian "reckons;" the illiterate Northerner "claims," and the Southerner of similar class, by a very curious reversal of the blunder, "allows," what better educated people merely assert. The pails and pans of the world at large become "buckets" when taken to Kentucky. It is "evening" in Richmond while afternoon still lingers a hundred miles due north at Washington. Vessels go into "docks" on their arrival at Philadelphia, but into "slips" at Mobile; they are tied up to "wharves" at Boston and Savannah, but to "piers" at Chicago and Milwaukee. Distances from place to place are measured by "squares" in Baltimore, by "blocks" in New York. The "shilling" of our own State is the "levy" of Pennsylvania, the "bit" of San Francisco, the "ninepence" of old New England, and the "escalan" of New Orleans. But put all these variations together, with such others as more microscopic examination might reveal, and how far short they fall of representing any thing like the real dialectic differences of speech that obtain, and always have obtained, not only as between the three kingdoms, but even between contiguous sections of England itself! What great city of this country, for example, has developed, or is likely to develop, any peculiar class of errors at all comparable in fixity and importance to the cockney speech of London? What two regions can be found within our borders, however sequestered and unenlightened, and however widely separated by geographical position, of which the speech of the one presents any difficulty worth mentioning, or even any very startling unfamiliarity in sound or construction, to the inhabitant of the other? Our omnipresent railroads, telegraph lines, mail routes and printing presses, and the well-marked disposition of every class of our people to make lavish use of these means of intercommunication, both for the rapid diffusion of intelligence and the interchange of opinion, and also, so far as lines of travel are concerned, for the frequent transportation of the people themselves hither and thither, with a degree of ease and celerity to which no other country has ever attained — these causes have always favored, and seem likely permanently to maintain, a cer-

*Article, "Some Impressions of the United States," published in the Fortnightly Review, and copied into the Eclectic for October, 1882, p. 435, and Littell for September 9, 1882, No. 1994, p. 602.

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tain community of expression as well as of thought, that is not only practically prohibitive of the formation of new dialects, but also rapidly effaces the prominent lineaments of such variations as have at different times been imported from the old world. If then, in this particular respect, we are depraving our mother tongue, the only logical inference that can be drawn is, that a language reaches its best estate in proportion as it is diversified by local peculiarities.

It ought to be remembered also, in this immediate connection, that the ordinary speech of the United States presents not greatly more of what may be called caste variations than of those that are attributable to differences of locality. A discriminating English traveler, the Rev. F. Barham Zincke, Vicar of Wherstead and Chaplain-in-Ordinary to the Queen, has mentioned as "a remarkable fact that the English spoken in America is not only very pure, but also is spoken with equal purity by all classes. * * The language in every man's mouth," he adds, "is that of literature and society. * * It is even the language of the negroes of the towns."* In other words, the speech of the lower orders of our people, even down to the very substrata, whether examined in regard to its vocabulary, its construction or its pronunciation, differs from what all admit to be standard correctness in a much smaller degree than we have every reason to believe to be the case in England, our enemies themselves being judges. A careful comparison of slang dictionaries, I think, will reveal a far longer list of unauthorized words as current among British thieves and "cadgers" than among their congeners in the United States. Grammatical rules are violated badly enough by the ignorant of our own cities every day, no doubt; but how often, after all, will you hear from intelligent and respectable working people of American descent quite such a solecism as the "I were" and "he were" that are so frequently noticed in the mouths of lower-middle-class Britons, accustomed all their lives to conversation with speakers of the purest English? And as for pronunciation, we have our faults, of course, in abundance, the best of us as well as the most careless, and should amend them with all diligence; but where, from the Atlantic to the Pacific, will you discover any such utter disability of hearing or discernment as can permit men to drop or multiply their *h's* or transpose their *w's* and *v's*?

II.

Speaking of pronunciation, and with regard to the sound of the language as used by the educated people of the two countries (a point

*"Last Winter in the United States;" John Murray, London, 1863.

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which most writers on Americanisms pass over with the briefest notice, though one of the ablest of them all, Prof. George P. Marsh, has devoted to it his chief attention), it must be admitted, I think, that if the typical English intonation is better than ours, it is because the office of language is what Talleyrand said it was — to conceal one's thought. That is to say, the average American college graduate, for instance, will speak more intelligibly and more agreeably wherever there is any difficulty in speaking, as before a large assembly or in the open air, than will the English university man. The Yankee may talk through his nose, to be sure; may unduly emphasize minor words, cut off terminal letters rather abruptly, or select too high a key; but he will not gulp or sputter; he will seldom insert superfluous *aw's* or *ugh's*, and the reporter who may have to follow his utterance will be far less liable to lose parts of a sentence, or to mistake one phrase for another, than in discharging the same duty on the other side.

And when it comes to orthoepy proper, the deliberate sounding of single words, it will be found that in almost every case the difference is due to the American's following more closely than does the Briton the spelling of the word — a practice which can hardly result in depraving the language, but seems rather to suggest that the American is the greater reader of the two, and therefore likely to be the safer guide in questions of verbal correctness. Thus the now thoroughly anglicized French word *trait*, in which none of us ever thinks of dropping the final *t*, is still commonly called *tray* in England, and that pronunciation is given the place of honor in the best British authority, Stormonth's excellent dictionary. *Sliver*, which very many Americans call *slīver*, following the obvious analogy of the more common word *liver*, and following, too, the example of the poet Chaucer, is *slīver* and *slīver* only, at present in Great Britain. *Schedule*, which we invariably pronounce *skedule*, constitutes in England almost the only exception to the rule that *ch* is hard after initial *s*, being there called *shedule*.

And in respect to geographical names, the closer adherence of our countrymen to the guidance of the orthography is, of course, notorious and manifest. Except the dropping, in imitation of the French, of the final *s* of *Illinois;* the two words *Connecticut* and *Arkansas* (the latter a very doubtful exception); and a few terms like *Sioux*, derived from corruptions of Indian names—I can hardly recall any geographical appellation indigenous to our soil which is not pronounced very nearly as it is spelled. And when names are imported with a well-authorized divergence between the sound and the spelling, a strong

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tendency toward the obliteration of this divergence is sure to become manifest. *Warwick* is about as often *Warwick* as *War'ick* when spoken of in America; *Norwich* is more commonly *Norwich*, I think, than *Norıdge*; *St. Louis* and *Louisville* are often called *St. Lewis* and *Lewisville*; a resident of Delaware County in this State would not know what place was meant if you spoke of the county seat as "Daily," so perfectly settled is "Delhī" as the pronunciation as well as the spelling of the name. A multitude of other instances might be mentioned, among the most remarkable of which, perhaps, is the change that has taken place in the popular sounding of the name *Chautauqua*. As long as it was spelled with a final *e*, people persisted in saying *Chautawk*, notwithstanding that the local practice was always otherwise; but an immediate reformation was effected, some twenty years ago, by the simple expedient of substituting an *a*. It is probably quite safe to say that no mispronunciation of a geographical name, growing out of an attempt to follow too closely the sound of its letters, has ever become so prevalent in Great Britain as even to suggest the idea of making the spelling conform to the orthoepy, and, furthermore, that if such a difficulty occurred, the attempted remedy in question would be found in that country quite unproductive of any change in the popular usage.

III.

Passing from orthoepy to orthography, it hardly need be said that in every instance without exception where a change in spelling has originated in the United States, the change has been in the direction of simplicity, and in the interest therefore of the "reform" which the Philological Society of Great Britain (not to mention such individual names as Max Müller, Dr. J. H. Murray, Prof. Newman, the Duke of Richmond, and Mr. Gladstone) so warmly favors. The dropping of the second *g* in *waggon*, the *u* in *parlour* and similar words, the *e* in *storey* (of a house), and the final *e* in *pease* * (plural of pea), are all changes in this direction; and so is the substitution of *w* for *ugh* in *plough*, and *f* for *ugh* in *draught*, and the abandonment of the spellings *shew*, *cyder*, † and especially *gaol*, the universal adoption of *jail* bringing the word into harmony with the rest of the language, as there is no other instance in English of a soft *g* before *a*—notwithstanding that some absurd people, who do not call Margaret *Marjaret* or Garfield *Jarfield*, will persist in saying *oleomarjarine*.

* Of course *pease* was not originally a plural word, but nobody thinks of it otherwise now.

† See Halliwell's Dictionary, art. "Griggles."

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IV.

In respect to at least one American spelling, that of *plow*, and probably others, it should not be forgotten that the prevalent practice in this country, though an indisputable innovation so far as modern usage is concerned, is really a return to the long abandoned custom of an earlier time, from which divergence without good reason has gradually grown up in England. And this brings us to another strongly marked characteristic of our American speech — its greater permanence and steadiness, so to speak, as compared with that of the mother country. Such a change of fashion as has occurred in London in respect to a lady's robe, which was universally called a "dress" a dozen years ago, afterwards a "gown," and now a "frock"— the words "dress" and "gown" being accounted alike vulgar at present — such a change as that would be well-nigh impossible in New York. The same peculiarity will appear very clearly, where it might least be expected, on close examination of any list of words supposed to have been greatly distorted in their meaning, or even manufactured out of whole cloth, by erring Yankees, a very large proportion of which will almost always be found to be good old English, grown obsolescent or obsolete at home, but preserved in the New World in their pristine vitality and force; and conversely, on examining such a book as Halliwell's Dictionary of Archaisms and Provincialisms, which contains, presumably, no word now in good use in Great Britain in the meaning given, the American reader will discover a great number of terms—nearly three hundred, I should say—with which he is perfectly familiar. I give a few examples, not including any that are marked as provincial, the direct inference being that all these words were once good English, but are no longer in common use in the mother country:

Adze (a carpenter's tool); *affectation* ("a curious desire for a thing which nature hath not given"); *afterclap; agape; age* as a verb; *air* in the sense of appearance; *amerce; andirons; angry*, said of a wound; *appellant* (one who appeals); *apple-pie order; baker's dozen; bamboozle; bay* in a barn; *bay* window; *bearers* at a funeral; *berate; between whiles; bicker; blanch* (to whiten); *brain* as a verb; *burly; cast* (to tie and throw down, as a horse); *catcall; cesspool; chafe* (to grow angry); *clodhopper; clutch* (to seize); *clutter; cockerel; coddle; copious; cosey; counterfeit* money; *crazy* in the sense of dilapidated, as applied to a building; *crock* (an earthen vessel); *crone* (an old woman); *crook* (a bend); *croon; cross-grained* in the sense of obstinate or peevish; *cross-patch; cross purposes; cuddle; cuff* (to beat); *deft; din; dormer* window; *earnest* money given to bind a bargain; *egg on; greenhorn; hasp; jack of all trades; jamb* of a door; *lintel; list* (selvage of cloth); *loop* hole; *nettled* (out of temper); *newel; ornate; perforce; piping hot; pit*

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(mark left by small-pox); *quail* (to shrink); *ragamuffin; riffraff; rigmarole; scant; seedy* ("miserable looking"); *shingles; sorrel* (the color); *out of sorts; stale* ("wanting freshness"); *sutler; thill; toady; trash; underpinning.* All these words, with many others equally familiar in the United States, are apparently regarded by Halliwell as having become obsolete in England.

It would not be difficult, on the other hand, to compile quite a list of Briticisms, including words recently invented in Great Britain, like *totalling*, or (still worse) *totting*, for adding up; *navvy*, for laborer; *fad*, for pastime*; *randomly*, for at random; *outing*, for pleasure excursion; *tund*, for beat †; and a larger class of old words now used in that country in a comparatively new and in some respects objectionable signification not generally recognized in the United States.

I remember hearing with astonishment, a dozen years ago, from an English gentleman of culture and high social standing, that it was necessary to remove the gates of Quebec, "to give more room for *traffic.*" I asked no questions, but wondered inwardly whether the people of the American Gibraltar were in the habit, like the ancient Orientals, of resorting to the gates of the town to exchange commodities with each other. On our arrival, next morning, the mystery was solved; it was travel, not barter, that my friend meant by traffic. The word is continually thus misused in England, and it must be sorrowfully admitted that the bad habit is now slowly invading this country as well, not so much among the people, however, as in a kind of technical way. The New York Central Railroad, for instance, has a "general traffic manager," who certainly manages no traffic, the corporation being carriers and not traders.

Other examples — as yet, happily, not naturalized in American usage — are: *Knocked-up*, for fatigued; *Famous*, for excellent — "we have had a famous walk," meaning an enjoyable one; *bargain*, for haggle‡ — "Mr. Boffin, I never bargain," says Silas Wegg in Our Mutual Friend (Book I, chapter 5) — he was bargaining at that very moment; *tiresome*, for disagreeable; the particularly refined and elegant expression *rot*, for nonsense; *jug*, for pitcher; *good form*, for in good taste; *trap*, for carriage; *tub*, for bathe; to *wire*, for to telegraph; *starved*, for frozen; *stop*, for stay — "not that she would mind, if I were to stop out till midnight," says Cynthia Walters, in Mallock's Romance of the

* "It is your favorite fad to draw plans" — Dorothea in Middlemarch, Book I, chap. 4.

† Even Spencer condescends to the use of this extraordinary vocable, though he offers a sort of semi-apology by putting it in quotation marks — Study of Sociology, chap. 8.

‡ The anonymous author of Chatto and Windus' Slang Dictionary (new edition, London 1874 falls into this error, which surely ought not to be expected of a lexicographer. See page 353 of the work referred to.

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Nineteenth Century (Book III, chapter 1); *assist*, for be present, as the silent auditors at a concert are absurdly said to "assist" at it; *plant* for fixtures, as the "plant" of a railway or a factory (I am not entirely certain about the last two words, but believe them to be comparatively new in England and very rarely used in the United States); *intimate*, for announce — advertisers in British newspapers continually "intimate" to their customers that they have changed their quarters or received new goods; and *tidy*, for almost anything complimentary — a London paper made mention the other day of "a very tidy bull," the writer meaning a valuable animal, and by no means intending to refer to any particular cleanliness in the beast's personal habits. English hostlers also — to get pretty well down in the social scale, though by no means going as low as do the compilers of what are termed Americanisms, in their search for blunders — English hostlers sometimes speak of *chilling* cold water, meaning warming it, an extraordinary perversion of a very common and elementary word.

It is not only, however, in their recent coinages and anomalous assigning of new meanings to old terms, that the English have made reckless changes in the body of our speech where the American practice adheres to the former standard. They have swung off in the opposite direction also, curtailing to no good purpose the significance of several words. A "young person," I believe, is always a girl in England, the term being never applied to a boy. An invalid is "ill," not sick, unless he happens to be nauseated, while at the same time, strangely enough, it is regarded as perfectly proper to describe him as confined to a sick-room or stretched upon a sick-bed. A Briton is horrified at the idea of *riding* in a carriage, although he makes no scruple of riding in an omnibus or a street-car. When you enter the vehicle at the side, you drive; when at the end, you ride. And if the author of Macleod of Dare is a trustworthy guide, the word *up*, used in reference to a journey in Great Britain, indicates, not that the traveler is seeking a more elevated region or moving northwardly, but solely that he is going toward the capital; "up to London" and "down to the Highlands" are, it appears, the correct formulæ. No wonder the young Scotchman thought it sounded "stupid." Fancy a man in Chicago saying that he was going "up to Washington," or a man in Washington speaking of events occurring "down in St. Paul!"

A third kind of variation that seems to have grown up in Great Britain to a greater degree than in this country, is the habit of turn-

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ing active and especially reflexive verbs into neuters by dropping the object, as, "Don't trouble" for "Don't trouble yourself."* It is true that a tendency in this direction can be traced a long way back in the history of the language. To *repent*, to *endeavor*, and some other now neuter verbs, were formerly reflexives; one *endeavored himself* in the same sense that we now *apply ourselves*, and *repented himself* as we now *bethink ourselves*. It is also true that a few alterations of this kind not yet sanctioned by good usage, but occasionally heard, may be said properly enough to be common to the two countries; "I avail of this opportunity," for "I avail myself of this opportunity," is one. But I think any careful reader of the now current literature of England and the United States will approve the opinion that our British brethren are going much faster in this direction than are we. As long ago as 1854 Miss Yonge wrote (in Heartsease, Part II, chapter 10): "Theodora flung away and was rushing off." Charles Reade, whom the astute Fitzedward Hall ranks among "the choicest of living English writers,"† is guilty of such phrases as "Wardlaw whipped before him" (Foul Play, chapter 15), "Ransome whipped before it" (Put Yourself in his Place, chapter 31), [Little] "flung out of the room" (same, chapter 32), and various others. These and similar incomplete sentences, not at all uncommon in British books and periodicals, certainly strike the American ear as decided innovations, and constitute a peculiarity of diction very rarely to be observed on this side of the water.

The English have also a practice, more pronounced by far than our own, of abbreviating a good many words in their common talk. They never call their consolidated government bonds anything but "consols," or the process of hypothecation anything but "hypothec." The Zoölogical Gardens in London are commonly known as the "Zoo," and a series of delightful popular concerts given every season in the same city are euphoniously denominated the "Monday pops." Hampshire, not in writing only, but in speech as well, is "Hants," Buckinghamshire is "Bucks," and Hertfordshire "Herts." A similar liberty is taken with the names of firms; "Smith & Co.," is often made to do duty, even in formal business letters, for the established title, "Smith, Brown & Robinson." One American establishment — of somewhat British propensities, however — Messrs. Ticknor & Fields of Boston, did at one time imitate this form of contraction, by gilding

* "We do not trouble to inquire"—*London Law Times*, quoted in *Albany Law Journal*, vol. 26, p. 121.

† Scribner's Monthly, vol. 3, p. 701.

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"Ticknor & Co.," on the backs of their books; but the practice has been abandoned by their successors, and I do not know that any other American house ever followed the example. Certain it is that about the longest and most awkward name in the book trade at present, "Cassell, Petter, Galpin & Co.," is always written in full in this country, though often contracted into Cassell & Co., in England.

In the construction of many sentences, however, an opposite plan is frequently followed — the insertion of utterly superfluous words. Thus one occasionally hears English ladies ask, "What*ever* are you doing?" — meaning, "What are you doing?" In Herbert Spencer's admirable treatise on Education, chap. 10, we read that "in Russia the infant mortality is *something* enormous;" and in one of Charles Dickens' letters to Mr. Forster, "the daily difference in [a ship's] rolling, as she burns the coals out, is *something* absolutely fearful;* few Americans would have put in the "something." And who has not been annoyed and disgusted by the innumerable *got's* with which so many English pages fairly bristle? Three good illustrations occur in a single article, "A Few Words about the Nineteenth Century," by Frederic Harrison, recently published in the Fortnightly Review: "He extolled him for possessing all the good qualities which he had not *got;*" "for twenty thousand years man has *got* no better light than what was given by pitch, tallow or oil;" "I don't say but what this work has *got* to be done." Or glance over Endymion: "He has *got* a champion" (chap. 35); "I have *got* some House of Commons men dining with me" (chap. 50); "I have *got* a horse which I should like you to ride" (chap. 52); "Lady Montford maintained they had *got* nothing" (*id.*); "All you have *got* to do is to make up your mind" (chap. 65); "You have *got* a great deal of private business to attend to" (chap. 99). So the Marquis of Blandford, in the North American Review for November, 1881, p. 459: "The Irish members are a feature which we have not at present *got* to deal with"; Spencer in the book just referred to (Education, chap. 3): "Must not the child judge by such evidence as he has *got*?" George Augustus Sala, Illustrated London News, October 2, 1880, p. 423: "To my shame, I have not *got* a Cowden-Clarke's concordance;" Wilkie Collins, Man and Wife, chap. 9: "I have *got* a letter for you;" and in Marion Fay, chap. 3: "'He has *got* money;' 'but he is not therefore to be a tyrant;' 'Yes, he is, over a daughter who has *got* none;'" Charles Reade, Foul Play, chap. 19: "I have *got* something for you" — in none of which cases is the idea of *getting* intended in the slightest degree to be implied,

*"A Short Life of Charles Dickens," Appletons' Handy Volume Series, p. 116.

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but only that of present possession. The general American dislike of this ugly word, and our practice, where the past participle of the verb *get* must be used, of adopting the old and softer form *gotten* (which is now scarcely ever used in England)* are not exactly what would be expected of a people who are ruining the language.

V.

I think moreover, though the opinion is of course only an opinion, and hardly susceptible of positive proof or absolute negation, that good English authors in general are less particular about many points of grammar than are Americans of the same class. Dean Alford is authority for the statement that "our best writers [meaning the best British writers] have the popular expression *these kind, those sort*,"† where *this kind* or *that sort* is intended; and I have noticed instances of this solecism in Bagehot (Physics and Politics, No. II, section 3— "Nations with *these sort* of maxims"), and in Miss Muloch (Agatha's Husband, chap. 1 —"The Iansons were *those sort* of religious people who think any Biblical allusions irreverent.") In a story called "The Ladies Lindores," published serially in Blackwood (Part II, chap. 4, No. 799 of the magazine, May, 1882) we find the following: "There are some happy writers whose mission it is to expound the manners and customs of the great. * * And yet, alas! to these writers when they have done all, yet must we add that they fail to satisfy their models. * * 'As if *these sort* of people knew anything about society!' Lady Adeliza says." Lady Adeliza, or her reporter, would do well to study a certain very elementary rule of grammar.

Worse than this, perhaps, is Charles Reade's occasional blundering with the nominative and objective cases, as where he makes the high-born and elegant Edward Fountain, Esq., of Font Abbey, inform his niece that "there will be only *us* two at dinner!" (Love me Little, Love me Long, chap. 1.) Worse still is the confusing of the verbs *lie* and *lay*, an error very rarely to be observed in respectable American society, but one to which Alford says Eton graduates are especially prone — and of which a striking instance may be found in an extraordinary place for a grammatical error, Stormonth's English Word-Book, where *laid* is actually given as the participle of *lie!* After noting this, one need hardly be surprised to find the same writer defining *Alborak* (in the supplement to his dictionary) as "the white

*See "English and American English," by R. A. Proctor, in the Gentleman's Magazine, copied into Appletons' Journal for October, 1881, and the New York Tribune of Aug. 14, 1881.

†The Queen's English, 11th thousand, ¶ 98.

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mule on which Mohammed is said *to have rode* from Jerusalem to heaven!" If an American lexicographer were caught using *laid* for *lain*, or *rode* for *ridden*, what a text it would furnish for a dissertation on the process of depraving our mother tongue which is advancing with such alarming rapidity in the United States!

And there are certain highly incorrect constructions, like "different to," which are notoriously British, and of which it is almost safe to say that no American is ever guilty. Spencer's "immediately this is recognized" (Study of Sociology, chap. 2), meaning *as soon as this is recognized*, and Buckle's "directly they came" (letter to Mrs. Grey, quoted in Huth's Life, chap. 2) meaning *directly after they had come*, are other instances. Buckle, it should be remembered, was anything, but a careless writer, having devoted great labor for a long time to the acquisition of a correct and polished style of composition. One would think he need not have spent many hours in this sort of study before discovering that such a sentence as "I put them away directly they came" is not English. (Since writing the last sentence, I have noticed, with disgust, an instance of exactly the same error in one of G. W. Smalley's letters from London to the New York Tribune, published April 24, 1882: "Directly he heard of the intended demonstration, Mr. Parnell left the train." But Mr. Smalley, like the lady in "The Mighty Dollar," has "lived so much abroad, you know," that some absorption of British blunders might well be expected of him; and I think one might spend a good deal of time in searching American literature, periodical or book, before he would find another case.)

Mr. Fitzedward Hall, as already quoted, is of opinion that educated people in this country have lost the ability to write our language as did the author of "Edgar Huntly" eighty years ago. But what must we think of the improvement that has been made on the other side of the sea when he turns the pages of Endymion and notices the following, among other phrases of similar correctness and beauty? "*Everybody* says what *they* like" (chap. 20); "I would never leave him for a moment, *only* I know he would get wearied of me" (chap. 39); "I have never *been* back *to* the old place" (chap. 63); *Everybody* can do exactly what *they* like" (chap. 98). Speaking in all seriousness, were it not on the whole preferable that the art of writing English should decline everywhere even faster than it has declined in this country since the close of the last century, rather than that it should develop into such perfection as is illustrated by the last literary production of an ex-prime-minister of Great Britain?

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VI.

Of course nobody thinks of denying, nevertheless, that a number of new, and in many cases uncalled-for, words and expressions have been invented and now pass current in the United States, or that the meaning of some others has been gradually warped, to the injury of the language, just as has occurred in England. This part of the subject has been laboriously investigated by several diligent students—so laboriously that there is little left to say about it except in the way of correction. Not to speak of articles in periodicals, brief essays, and single chapters, no less than five books devoted entirely to so-called Americanisms in speech have from time to time appeared — Pickering's Vocabulary, in 1816; Noah Webster's "Letter," in 1817; Elwyn's Glossary, in 1859; Schele de Vere's Americanisms, in 1872; and Bartlett's Dictionary—most comprehensive of all, and now the standard book of reference—of which the first edition was published in 1848, the second in 1859, the third in 1860, and the fourth, considerably enlarged, in 1877. The student of language will find much to interest, and not a little to amuse him, in each of these compilations of monstrosities.

VII.

John Pickering's "VOCABULARY, OR COLLECTION OF WORDS AND PHRASES which have been supposed to be peculiar to the United States," originated in the author's practice, while living in London during the first two years of this century, of noting down, for the purpose of avoiding them, such of his own verbal expressions as were condemned for American errors by his British friends. After returning to this country, he communicated a paper on the subject, consisting of an essay and a list of words, to the American Academy of Arts and Sciences, and shortly after, having largely amplified the vocabulary, submitted the whole to the candor of his countrymen for their instruction and admonition. The poor man was deeply concerned for the future of the language in America, and very much in earnest in his work. It might indeed be a long time, he thought, before it should "be the lot of many Americans to publish works which will be read out of their own country; yet all who have the least tincture of learning will continue to feel an ardent desire to acquaint themselves with English authors. Let us then," he proceeds, "imagine the time to have arrived when Americans shall no longer be able to understand the works of Milton, Pope, Swift, Addison and other English authors justly styled classic without the aid of a translation

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into a language that is to be called at some future day the American tongue! * * * Nor is this the only view in which a radical change of language would be an evil. To say nothing of the facilities afforded by a common language in the ordinary intercourse of business, it should not be forgotten that our religion and our laws are studied in the language of the nation from which we are descended; and, with the loss of the language, we should finally suffer the loss of those peculiar advantages which we now derive from the investigations of the jurists and divines of that country."

To do what lay in his power to avert a calamity so appalling, was the object that Mr. Pickering had in view; and lest his own impressions should be faulty, or his imperfect knowledge of pure English should prove inadequate to the task of properly branding all the principal American corruptions, he took the pains of submitting his list to several well informed friends, and particularly to two English gentlemen whose authority he considered beyond question, although he admits that as they had lived some twenty years in America, "their ear had lost much of that sensibility to deviations from the pure English idiom which would once have enabled them to pronounce with decision in cases where they now felt doubts." As finally published, the Vocabulary contains over five hundred words, of which not more than about seventy, less than a seventh of the whole number, are really of American origin and now in respectable use. As examples may be cited — *backwoodsman, barbecue, belittle, bookstore, bottomlands, breadstuff, caucus, clapboard, creek* in the sense of brook or small stream, *declension* of an office, *deed* as a verb, *desk* for pulpit, *dutiable*, to *girdle* a tree, *gubernatorial, hominy, intervale, salt-lick, lot*—a division of land, *lumber, offset, pine barrens, portage, rapids, renewedly, samp, section* of the country, *sleigh, span* of horses, and *staging* for scaffolding. The other six-sevenths of the book consists of, first, mere vulgarisms and blunders; second, unauthorized expressions invented by eccentric writers and never generally adopted; and, third, of words really British in their origin though not current in good London society — to which last class, by the way, it is highly probable that several of the terms above mentioned as genuine Americanisms might be transferred, were their full history known.

The Vocabulary was reviewed by Noah Webster in a letter to the author, published at Boston in 1817, and by Dr. Beck in a paper read before this Institute, March 18, 1829, and included in the first volume of the Transactions.

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VIII.

Dr. Elwyn's GLOSSARY OF SUPPOSED AMERICANISMS was undertaken, as the preface informs us, "to show how much there yet remains, in this country, of language and customs directly brought from our remotest ancestry" — a purpose quite different from that of Mr. Pickering; but the chief value of the book, in my estimation, lies in the contribution it makes to our knowledge of Pennsylvania provincialisms, of which the author is evidently a careful observer. About four hundred and sixty words are included, of which I will venture to say that a clear majority would be quite as little understood in decent American as in decent British society; but it seems that we have been accused of manufacturing the whole list, while the fact is that they are one and all of foreign origin. The book is carelessly written, and not accurately alphabetized.

IX.

Schele de Vere's "AMERICANISMS," a small octavo of something less than seven hundred pages, differs from the other works mentioned in not adopting the dictionary form, but presenting our verbal peculiarities as arranged in various classes — those invented by the Indian, the Dutchman, the Frenchman, the Spaniard, the German, the Negro, and the Chinaman; expressions peculiar to the West, to the church, to politics and to trade; marine and railroad terms; cant and slang; new words and nicknames, etc. The author has been accused of plagiarizing from Bartlett, and doubtless did avail himself freely of the labors of that diligent lexicographer; but he added a good deal of original matter, and his book possesses an interest of its own, being indeed the only one of the four that is likely to be read entirely through. About four thousand items appear in the index.

X.

BARTLETT'S DICTIONARY (or, to give the full title, "Dictionary of Americanisms, a Glossary of Words and Phrases usually regarded as peculiar to the United States, by John Russell Bartlett,") is, in its latest edition, a bulky octavo of over eight hundred pages, exceedingly well printed, and containing something above five thousand six hundred entries, but hardly representing, I think, more than about five hundred and fifty genuine and distinct Americanisms now in decent use —less than one-tenth of the whole number of articles. Of the remainder, nearly four hundred words and phrases are set down by the author himself as of British origin, some being used in this country in exactly the same manner as on their native soil, while others have been slightly al-

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tered in meaning, application or sound. At least a hundred and seventy-five more — and probably a much larger number — are also certainly British, though Mr. Bartlett seems not to be aware of it. The rest of the dictionary—say four-fifths—is made up, partly of expressions never in general use, or long since antiquated; partly of mere mispronunciations, grammatical errors and unauthorized contractions; partly of vulgar and disgusting slang; and partly of wearisome repetitions. Yet I by no means desire to be understood as setting down the work for a mass of rubbish. On the contrary, it contains a vast fund of interesting and curious information, which any man devoted to the study of English dialects might well be proud to have brought together. Only it is a great pity that the diligent compiler, in his anxiety to make a big book, allowed himself such extreme latitude in his conception of what constitutes an Americanism in speech, and consequently buried his grains of wheat under so appalling a mountain of chaff.

It may be worth while to present some samples of the words that are improperly included in Bartlett's Dictionary, as showing the means by which a tremendous number of pseudo-Americanisms have been, first and last, accumulated by people who find satisfaction in counting them up.

Of the three hundred and eighty-five words and phrases that the author himself sets down as of British origin, the following examples may be mentioned:

To beat one *all-to-pieces*, or *all-to-smash*; *allow*, for assert *argufy*; *awfully*, for very; *bail*, the handle of a bucket; *barm*, for yeast; *bound*, for determined or resolved; a *bull*, on the stock exchange; *bumptious*, for self-conceited; *can't come it*; *cap sheaf*; *cheek*, for impudence; *chowder*; *clip*, a blow, as, "he hit him a clip;" to *collide*; to *cotton to* a man; *cracker*, for a small biscuit; *cute*; to *cut stick*; a *deck* of cards; *deputize*; *doxologize*; *dreadful*, for very, as "dreadful" fine; *every once in a while*; *fall* of the year; *first-rate*; *fix*, to put in order; *flapjack*; *flummux*; *freshet*; *gallivant*; *galoshes*; *given name*; *goodies*; to *gulp*; *hand-running*; *hard up*; *heft*, for weight; *help*, for servants; *homely*, not handsome; *hook*, to steal; *immigration*; *jeopardize*; *julep*; to *keep company*; to *loan*; *mad*, for angry; *mighty*, for very; *old fogy*; *over the left*; *pair* of stairs; *pled*, for pleaded; *pry*, a lever; to *pull up stakes*; to *reckon*, meaning to think, believe or suppose; *reliable*; *rooster*; *no great shakes*; *sophomore*; *spell* of weather; *spry*; *spunk*; *starvation*; *stricken*, for struck; *sundown*; *swap*; to *take on*; *talented*; *teetotaller*; *ugly*, for ill-tempered; to *wallop*, and to *whale*; *whapper*; to *whittle*, and to *wilt*. In many cases no reason whatever is assigned for including these words in a list of Americanisms; very seldom is any better cause mentioned than that they are provincial or antiquated in Great Britain; and sometimes the pretext

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is of the most trivial character, as in the case of the word *whittle*, which is put in, forsooth, because both the verb and the practice are thought to be more common in America than in England! But the most surprising instance among this class of words has yet to be mentioned — the use of the adverb "*immediately*," in place of the phrase "as soon as" — "the deer fell dead immediately they shot him." This wretched expression, Mr. Bartlett writes, is creeping into use from England. What possible sense there can be in counting as an Americanism a villanously ungrammatical construction which is "creeping into use in this country from England," it would puzzle Fitzedward Hall himself to explain.

Among words and phrases erroneously supposed by Mr. Bartlett to be peculiar to this country, the following have been pointed out by various reviewers of the dictionary:

Baggage; *bender*, a spree; *blackberry*; *blow*, to brag; *bluff*, a high bank; to *do a thing brown*; *bug*, as a general term; *bureau*, a chest of drawers; *catamount*; *choker*, a cravat; *chore*; *crevasse*; *cunning*, in the sense of small and pretty; *educational*; *eelgrass*; to *egg on*; *engineer* of a locomotive; *every which way*; *expect*, for suppose; *fast*, for dissipated; *fellowship*, as a verb; *female*, for woman; *first-class*; to *go to the bad*; to *go gunning*; *in a horn*, meaning "over the left;" *kink*, an accidental knot or twist; the whole *kit* of them; *muss*, a state of confusion; *notions*, small wares or trifles; *railroad*, as the equivalent of railway; *sappy*, meaning silly; *slosh*, soft mud; *smack*, a blow; *splurge*; *spree*; *swingletree*; a *good time*; and *tiptop*.

To these may be added the following, which I believe no reviewer has noticed:

Ampersand—The short character for the word *and*. This is found in Halliwell.

Beef, an ox, and *Blaze*, a mark on a tree, are both in Halliwell.

Clever, in the sense of good-natured. This is in Halliwell—said to be provincial in the south of England.

Cookey—A little cake. In Prof. J. F. W. Johnston's "Notes on North America," chap. 23, vol. 2, p. 296, we read that this word is familiar to a Scotchman's ears.

Cradle Scythe is in Halliwell.

Firedogs—Andirons. This is found in Brockett's Glossary of North-Country Words.

Hulking (unwieldy), *Jack-at-a-pinch*, and *Pitch-in*, are all in Halliwell.

Right for *very*. Fancy setting this down as an Americanism! Did Mr. Bartlett ever hear of a Right Honorable minister of Great Britain, or ever read the 139th Psalm—"Marvellous are thy works, and that my soul knoweth right well"?

To *set to rights*. This is said by Elwyn to be an Essex provincialism.

Safe—A place of security. This also is in Elwyn, and said to be from Suffolk.

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Sauce—Impudence. This is in Halliwell.

Shinny—A boy's game. This is in Brockett.

Span, for *perfectly*. The expression "span new" is as old as Chaucer.

Stand, a platform, and *Stock*, equivalent to *cattle*, are both in Halliwell.

Stop for *stay*, as "I am stopping at a hotel." The insertion of this detestable Briticism in a dictionary of Americanisms, of all places in the world, is one of the absurdities of the book. Everybody who knows anything about the variations of the language as spoken in the two countries knows that it is heard a thousand times in England for once that it is noticed here.

Too thin. Here is another Americanism of a very remarkable kind. Smollett was guilty of it, for he wrote, in "Peregrine Pickle" (published 1751), chap. 26: "This pretext was too thin to impose upon her lover." And Shakspere, a century and more earlier, in Henry VIII., Act 5, Scene 2, makes the King say: "You were ever good at sudden commendations, Bishop of Winchester. But know I come not to hear such flattery now, and in my presence; they are too thin and base to hide offences." Other instances could no doubt be found in plenty, if it were worth while to look for them. But when one considers that the phrase is invariably applied—as Smollett applies it—to *pretexts*, coverings, what can be more obvious than that it must necessarily always have been, not only perfectly good English, but the simplest and most natural expression imaginable? The insertion of a phrase like that in a list of Americanisms or any other sort of isms, only shows what follies men may be led into, upon whom the craze for making long compilations has once seized.

Tophet—The place of torment. This familiar Biblical term is of course just as much an Americanism as is *Eden*, or *Babylon*, or *Jerusalem*.

Touch-and-go. Who does not remember the "touch-and-go young Barnacle" of the Circumlocution Office in Charles Dickens' "Little Dorrit"?

Tramp, a strolling vagabond, is in Halliwell.

"*Well*," a meaningless preface to a sentence. The word is twice used in this way by highly-aristocratic speakers in the first chapter of Beaconsfield's "Endymion." The author would have been slightly amused if Mr. Bartlett had informed him that he represented Sidney Wilton and William Ferrars as conversing in the American dialect.

It would be unprofitable to detail examples of the mere errors, vulgar expressions and slang terms which Mr. Bartlett enumerates as peculiarly American. A few instances of his senseless repetitions, enlarging the book to no possible good, may be mentioned with less disgust:

"Bankit (French Banquette)" is defined as a sidewalk in Louisiana. Immediately below we have "banquette, the name for the sidewalk

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in some of our southern cities." "Bowie," and "bowie-knife" are separately entered. "Breakbone" is "a species of fever," and then follows "breakbone fever," with full definition. "Bulldoze" is "to intimidate," and on the next page we have "to bulldoze," "to intimidate by violent means." "Filibuster" is a freebooter; "filibustering" is "freebooting;" and "to filibuster" is "to aquire by freebooting;" three separate entries. "A loafer" is an idle lounger, and "to loaf" is "to lounge." "To lynch," "lyncher" and "lynch law" are separately explained. "Muss," a corruption of "mess," is first elaborately defined as a noun, with examples, and then as a verb. A "pony" is a translation, and "to pony" is to use a translation. "To post" a person is to inform him, and then we are told that "posted" means informed. "To red up," meaning to set in order, is twice defined — once on page 517 and again on page 520. "To run" is "to cause to run," with the phrase "to run a church" as an example; and just below we find another entry — "to run a church," "to have the charge of a church." "To spin street yarn" (page 636) is "to go gadding about the streets;" and on page 798, under the heading "street yarn," we learn that "to spin street yarn" is "to frequent the streets without any definite object." A "stove pipe" is a tall hat; and then follows a second entry, "stove pipe hat, a tall hat." A "suck in" is "a cheat," and "to suck in" is "to take in, to cheat." Many more instances might be mentioned; but it is hardly necessary to go further than this, in order to show how the book is filled up and expanded, without rhyme or reason. Mr. Bartlett would have done better to take pattern from Halliwell's admirable dictionary, a work that contains nearly ten times as many entries as the Dictionary of Americanisms, but fills less than fifty more pages.

Coming now to genuine Americanisms, words and phrases really peculiar to this country, or used here in a sense never recognized in England — it is needless to take note of any that are correctly defined by Bartlett, his book being, as has been said, notwithstanding all its faults, indisputably the standard work of reference on this subject. Among those that he has either omitted, or about which his statements seem to invite remark, are the following:

Blizzard.— This remarkable word Mr. Bartlett defines as "a poser," having noticed, apparently, only a single instance of its use, and jumped at the conclusion that this is the meaning intended. He adds the comment, "not known in the Eastern States," which was generally true, no doubt, until the sharp winter of 1880–81 familiarized the term — as well as the thing itself, in a greatly modified form — to the residents of the East. I suppose I need not say that a real blizzard,

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as the word is now understood, is a terrific storm, with low barometer, light clouds or none at all, "and the air full of particles of snow, in the form of dry, sharp crystals, which, driven before the wind, bite and sting like fire."* The term is said to have made its first appearance in print about the year 1860, in a newspaper called the Northern Vindicator, published at Estherville, Minn. Its etymology can only be guessed at, but there has been no lack of guesses. The English word *blister;* the French *bouillard* (see Surenne's Dictionary); the German *blitz;* the Spanish *brisa;* the surname *Blizzard* (said to be common around Baltimore); an unpronounceable Sioux term; and the Scotch verb *blizzen*, of which Jamieson's Dictionary remarks that "drought is said to be *blizzening* when the wind parches and withers the fruits of the earth"—all these, and I know not how many other words in different languages, have been suggested, with various degrees of improbability, as the origin of the term. My own conjecture is, that it is simply an onomatopœia; an attempt, not wholly unsuccessful, to represent the whistling and "driving" noise of a terrible storm. It should be added, before leaving this word, that it seems to have been occasionally used in various places in the Eastern States, for a long time past, in significations quite different from its present meaning. Thus a newspaper correspondent writes from Solon, Me., to the effect that twenty or thirty years ago the phrase "let her blizzard" was common in that locality, meaning "let her go," as applied to the act of firing a gun or throwing a stone. Another, living in Perry County, Pa., has heard the word for many years as the equivalent of a drink—"let's take a blizzard." It is said also to have been in use in the same county in its present signification, as early as 1836, but to have become obsolete in this meaning, years ago. [Since this paragraph was set, I have received a letter from a well-informed friend at the West, who says: "This word is in common use in Texas, and has been for many years to describe a very severe 'norther.' It has been stated to me on competent authority that the thermometer has been known to register from, say, 86° down to 26°, the change being effected within the space of six or seven hours! This has always been popularly known as a blizzard. When the temperature in the summer season would be lowered only say 20°, it was known only as a norther. I think the term has gradually crept northward, until its significance is generally understood west of the Mississippi."]

Boom—A semi-slang expression (though it appears in the 1881 supplement to Worcester descriptive of a sudden advance in popularity or in price. Said to be borrowed from the mining phraseology of the far West, where a process called "booming" is sometimes adopted to clear off surface soil and reveal supposed mineral veins. An artificial reservoir is constructed near the summit of a mountain, which is first allowed to fill with water and is then suddenly opened, whereupon a terrific torrent rushes down the slope, carrying rocks, trees, earth and all, with resistless force. A newspaper writer says he has "seen gullies fifty, seventy-five, and in some places a hundred feet deep, and

* *Cultivator and Country Gentleman*, Albany, N. Y., Vol. 44, p. 340.

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extending the whole length of the mountain," cut out by single booms. "The word booming," he adds, "has therefore a very significant meaning, and is expressive as a word phrase, for it denotes an overwhelming, irresistible power and force."

To *buck against*—To oppose violently. I suppose this verb to be of American invention.

Canaille—Shorts, or low grades of flour; so defined in the Worcester Supplement, where it is said to be common in Canada and New England.

Casket—A kind of coffin. This first appears in the Webster Supplement of 1879.

Coal. Bartlett blunders fearfully in attempting to give the names of the different sizes of coal. His list is: 1, Broken or furnace coal, being the largest lumps; 2, Stove or range; 3, Pea or nut; 4, Egg; 5, Coal dust. I believe the correct nomenclature is: 1, Furnace; 2, Egg; 3, Stove; 4, Chestnut; 5, Pea; 6, Buckwheat; 7, Coal dust.

Coral of lobster—Unimpregnated eggs. Not in the dictionaries, except the Webster Supplement, and incorrectly defined there.

Dodger—A small hand-bill; not in the dictionaries.

Escalan — Twelve and a-half cents, a New Orleans term not in the dictionaries.

Fair—An exhibition, not primarily for the purpose of sale. This very common American use of the word is not recognized by any dictionary in ordinary use, though the authority of a recent writer in the Westminster Review (No. 230, October, 1881, p. 247 of the Scott edition) may be cited in its support.

French—A term used in Maryland and Virginia for anything that is greatly disliked. "For instance," says a writer, "the tobacco gets the worm in it that destroys it; they call in 'frenching.' And if the children have the measles very bad, it is 'French,' and the same with a bad case of small-pox—it is the 'real French small-pox.'"

Furore—An excitement; not in any English dictionary, so far as I know, although it is found in one of Bartlett's citations, under the heading "Nick."

Gripsack—A recently-invented and rather vulgar term for a satchel, chiefly heard, I believe, at the West.

Handglass. Bartlett says handglasses are spectacles. My impression is that the term generally denotes a small looking-glass.

Highwines. I am not certain that this is an American coinage, but I believe it appears in no dictionary except the Worcester Supplement.

Institute—A convention. Farmers' institutes—meetings lasting two or three days, with lectures and discussions, are very common at the West; and there is a post-office called "Farmers' Institute" in Tippecanoe County, Ind.

Keet. Bartlett says "Guinea keets" are Guinea fowls. I think the "keets" are Guinea *eggs*—so called at the West. See Milwaukee

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Republican-Sentinel, Dec. 7, 1882 (No. 12,551), second page, second column.

Liable for *likely*. A vulgar error that sometimes creeps into good company. I have noticed two instances in the New York *Tribune*—one of them in an editorial. ("Guero is so hostile to the whites that he is liable to cut loose at any moment;" Jan. 2, 1880. "The Navy Department seems to have acted on the theory that the vessel is liable to turn up where she is least expected;" June 17, 1881.)

Mung news. Bartlett says this means false news. I have never heard the word; but a writer in Blackwood's Edinburgh Magazine for October, 1877, says it is the preterito of the old English verb *ming*, to mix—whence *mingle*—and means, not false, but confused, mingled, mixed up.

You *must not*, as the reverse of you *may*. I am inclined to think this is an Americanism, as I judge that the English generally say "you may not"—in which, if so, they are certainly more logical than we. "You must" means that an obligation rests upon you; therefore "you must not," ought to mean merely that there is no obligation. "You may," means that permission is granted, and therefore when permission is withheld and the action prohibited, the phrase ought to be "you may not," instead of the universal American practice of saying "you must not."

Closely allied to this, is the incorrect use of *can* for *may*, where there is no question of ability—which seems to be rather more prevalent in this country than in England. A line on the face of our postal-cards makes the absurd statement that "nothing but the address can be placed on this side." The possessor of the card *can* place there any number of words that there is room for, if he pleases. What is meant is, of course, that nothing but the address *may* be placed there; that is, it is forbidden to place there anything else, under penalty of forfeiting the privilege of sending the card by mail. The English newspaper wrappers have a similar notice, correctly worded: "This wrapper *may* only be used for newspapers, or for such documents as are allowed to be sent at the book-rate."

Ninepence—Twelve and a-half cents. Formerly used in New England and Virginia.

Pit—The stone of a fruit. "Mostly confined to New York State," Bartlett says. I think the term is now common at the West, and used to some extent in the South, at least in Alabama.

Railroad Nomenclature. Bartlett gives a list of eighteen objects pertaining to railroads, which have different names in the two countries; but fails to note that the American "buffer" is the English "bumper," and the American "grade" the English "gradient."

Round-up—An annual collection of cattle on the plains of the West, for branding and other purposes. Not in the dictionaries. Perhaps from Spanish *rodear*, to encompass.

Smitch—A very small quantity of anything. This word is noted

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by a writer in Lippincott's Magazine for March, 1869, as peculiar to Carbon County, Pa. I have heard it in Albany.

Solid-colored— All of the same color. This expression, very common among breeders of Jersey cattle, and also used, I believe, in the dry-goods trade, may not be an Americanism perhaps, but no dictionary defines it.

Spilth — in the sense of street mud. This occurs in a story called "Alice Brand," by A. G. Riddle, published by the Appletons of New York in 1875, page 259.

Super. Bartlett says this is a contraction of "superintendent of factories, theatres," etc. What the "super" of a factory may be, if there is an official so called, I do not know; but the "super," or, as he is commonly called, the "supe" at a theatre, is certainly by no means a superintendent, but a supernumerary.

Tenderfoot — A new arrival from civilization in the wild regions of the far West — see Scribner's Monthly, vol. 18, p. 815. Not in the dictionaries. There is a post-office called "Tenderfoot" in Custer County, Dakota.

Whiskey. It is perhaps to Mr. Bartlett's credit that he does not seem to be very well "up" on the varieties of this popular beverage, as he remarks that "Bourbon whiskey is the best, being made of rye." As to the question of Bourbon's being the best, there may be differences of opinion; our Scotch and Irish friends, to say nothing of others, would perhaps dissent from the lexicographer's judgment; but as to Bourbon's being made of rye, we must all take exception to that statement, the fact being, I believe, that Bourbon never contains more than one-third of rye, and seldom as much as that.

To these genuine Americanisms may be added a few scientific or pseudo-scientific words, such as *phonograph, photophone, audiphone* and *lysimeter. Telephone,* as may not be generally known, is, like *telegraph,* much older than the apparatus that we now call by these terms; the original telegraph was a semaphore, and the original telephone, I believe, a speaking trumpet. And if time permitted, and the game were worth the candle, a numerous list of curious names of places, of American invention, might be compiled from the Post-Office Directory. Mr. Bartlett has done something at this, in his preface; but he failed to notice Why Not, Autumn Leaves, Bird-in-Hand and Youngwomanstown, Pa.; Bogus, Fiddletown, Hay Fork, Port Wine and Yankee Jim's, Cal.; Nola Chucky, Jim Ned, Mouse Tail, A. B. C. and U Bet, Tenn.; Long Year and The Corner, N. Y.; Hash Knife and Mud Creek, Texas; Star of the West, Sub Rosa and Gum Log, Ark.; Non Intervention, Va.; Quashquetown, Iowa; Medybemps, Me.; Rooster Rock, Oregon; Look Out, Dak.; Rabbit Hash, Ky.; Ty Ty, Geo.; Zig, Mo.; Skull Valley, Ariz.; Greenhorn, Left Hand, Ni Wot and O. Z., Col.; T. B., Md., and scores of other oddities that might be men-

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tioned. It is a thousand pities that we have not preserved a greater number of the more euphonious geographical names of the aborigines; and it is to be sincerely hoped that as refinement and good taste become more general, we shall by degrees weed out most of these rough-and-ready appellations.

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NOTE.—The author of this paper will be greatly obliged for any corrections. Please address at Albany, N. Y.

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Western avenue, near Robin

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Wm. H. Hale, Ph. D.,
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Robert M. Hamilton,
249 Lark.

Samuel Hand,
220 State.

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Wm. H. Hawkins,
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Henry V. D. Z. Hull, M. D.,
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298 State.

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5 Douw's Building,
cor. State and Broadway.

James H. McClure,
196 State.

St. Clair McKelway,
Argus Office.

Edward N. McKinney,
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Kenmore.

Harry Macdona [Cor. Mem.],
Senate Chamber.

John W. McNamara,
82 State.

James McNaughton, C. E.,
238 State.

George H. Mallory,
337 Hudson avenue.

Henry H. Martin,
152 State.

Henry T. Martin,
152 State.

John H. Mars,
N. Y. Central avenue.

Andrew E. Mather,
447 & 449 Broadway.

Frederick G. Mather,
99 Lancaster.

Charles W. Mead,
86 State.

Orlando Meads, LL. D.,
4 Pine.

George R. Meneely,
30 Elk.

Lansing Merchant,
45 Trinity Place.

Gustavus Michaelis,
16 Norton.

Ernest J. Miller,
89 Hawk.

Nathaniel C. Moak,
34 Lancaster.

Walter B. Moore,
55 North Pearl.

Jacob S. Mosher, M. D., Ph. D.,
3 Lancaster.

George S. Munson, M. D.,
138 State.

Samuel L. Munson,
246 Hudson avenue.

David Murray, LL. D.,
Regents' Office,
Old Capitol.

Charles Newman,
457 Broadway.

Rev. Frederick M. Newman,
679 Broadway.

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DeAzro A. Nichols,
395 Broadway.

Horace M. Paine, M. D.,
105 State.

Howard S. Paine, M. D.,
105 State.

Erastus D. Palmer,
5 Fayette.

Ivan N. Panin,
11 Park.

Charles H. Peck,
State Museum of Nat. History, corner State and Lodge.

John S. Perry,
111 Washington avenue.

John T. Perry,
111 Washington avenue.

Nathan B. Perry,
115 Hudson avenue.

Wm. L. M. Phelps,
158 Jay.

Henry R. Pierson, LL. D.,
38 State.

Daniel J. Pratt, Ph. D.,
142 Lancaster.

Richard Prescott,
High School.

John V. L. Pruyn, Jr.,
13 Elk.

Robert C. Pruyn,
38 Willett.

John H. Quinby,
448 Broadway.

Charles H. Ramsey,
71 State.

Joseph H. Ramsey,
71 State.

Edward W. Rankin,
31 North Pearl.

Clarence Rathbone,
5 Elk.

J. Meredith Read,
7 Elk.

Harmon P. Read,
7 Elk.

Edward Reed,
221 State.

Edward T. Reed,
154 State.

J. Howard Reed,
154 State.

J. Livingston Reese, D. D.,
80 Lancaster.

Edward D. Ronan,
10 Park.

Simon W. Rosendale,
147 Lancaster.

Jacob G. Runkle,
71 State.

Grange Sard, Jr.,
166 Washington avenue.

Rev. David L. Swartz,
498 Clinton avenue.

John F. Seman,
550 Broadway.

Hiram E. Sickels,
25 North Pearl.

Nathan E. Simons,
26 First.

Henry L. Smith,
48, 50 State.

Horace E. Smith, LL. D.,
74 State.

Norman L. Snow, M. D.,
170 State.

Charles T. F. Spoor,
26 North Pearl.

Benjamin I. Stanton,
29 North Pearl.

Rev. Horace C. Stanton,
85 Ten Broeck.

John Templeton,
Albany County Bank, 71 State.

James Ten Eyck,
37 Dean.

Philip Ten Eyck, M. D.,
64 Lancaster.

Jonathan Tenney,
Y. M. A. Library, 56 North Pearl.

Ralph W. Thacher,
448 Broadway.

David A. Thompson,
444 Broadway.

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Wm. W. Thompson,
74 State.

Lemon Thomson,
8 Ten Broeck.

Frederick Townsend,
3 Elk.

Howard Townsend,
21 Elk.

Stephen V. R. Townsend,
21 Elk.

Gilbert M. Tucker,
395 Broadway.

Luther H. Tucker,
174 Washington avenue.

Richard H. Tucker,
131 North Pearl.

Willis G. Tucker, M. D., Ph. D.,
4 Lancaster.

Clarence Valentine,
19 Chestnut.

Wm. T. Valentine,
19 Chestnut.

Garret A. Van Allen,
24 Lancaster.

Thomas J. Van Alstyne,
9 Douw's Building.

Wm. C. Van Alstyne,
59 North Pearl.

John H. Van Antwerp,
N. Y. State Nat. B'k, 69 State.

Wm. M. Van Antwerp,
162 Washington avenue.

Clarence Van Benthuysen,
8 Elk.

Frank Van Benthuysen,
407 Broadway.

Albert Van Derveer, M.D., Ph. D.
28 Eagle.

Andrew Vanderzee,
Beaver Block,
South Pearl.

Theodore V. Van Heusen,
470 Broadway.

Maurice E. Viele,
41 State.

Edward Wade,
293 Hamilton.

Frederick C. Ward,
12 Hawk.

Samuel B. Ward, M. D.,
135 North Pearl.

James M. Warner,
244 State.

Edward P. Waterbury
Normal School.

Daniel W. Wemple,
140 Lancaster.

Charles F. Wheeler D. S.,
219 State.

Oren E. Wilson,
84 Dove.

Orrin S. Wilson,
N. Y. State Survey Office,
Capitol.

Chauncey P. Williams,
284 State.

Rev. Charles Wood,
Kenmore.

J. Hampden Wood,
2 Park Place.

Edwin D. Worcester, Jr.,
25 North Pearl.

Frank P. Wright.
90 Jay.

William A. Young,
Hope Bank, 65 State.

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INDEX.

Albany, Industrial and Material Progress 85
Proposed Erection of Historical Monuments.... 137
Albany Institute, Annual Addresses..... 85, 227
Members, Acting Resident, May 1, 1883 361
Officers for 1883..... v
Browne, Irving, Paper by 320
Chadbourne, Paul A., LL. D., Address by 227
Dearborn Manuscripts, Account of 128
De Potter, Armand, Paper by..... 241
English Language in America..... 334
Linguistic Discussions 306
Words, Degraded..... 39
Force, Origin of..... 77
Fossils of the Niagara Formation..... 57
Upper Helderberg and Hamilton..... ... 145
Utica Slate 18
Gravestones Æsthetically and Ethically Considered 320
Hall, James, LL. D., Papers by 57, 145
Homes, Henry A., LL. D., Papers by.....128, 245, 271
Howell, George R., Paper by.. 306
Hutchins, Stephen C., Papers by 77, 198
Insanity, the Plea of..... 290
Men, the First..... ... 198
Miller, Ernest J., Paper by..... 105
Murray, David, LL. D., Address by..... 85
Music, Prehistoric..... 241
New York State, Arms of 245, 271
Prescott, Richard, Paper by 217
Sciences, Physical, and Civilization..... 227
Smith, Horace E., LL. D., Paper by..... 290
Tucker, Gilbert M., Papers by..... .....39, 334
Utica Slate and Related Formations 1
Ventilation, Principles of 217
Walcott, C. D., Papers by 1, 18
Whittington and His Cat 105

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EXPLANATION OF PLATE I.

DENDROGRAPTUS COMPACTUS.

Page 21.

Fig. 1. Frond showing the mode of branching, and its compact character as compared with associated forms.

GRAPTOLITHUS ANNECTANS.

Page 20.

Fig. 2. A very perfect frond, showing the small radical and the widely bifurcating, slender, flexuous stipes.

Fig. 2 a. Enlargement of a portion of the stipe to five diameters to show the character of the cellules.

SAGENELLA AMBIGUA.

Page 22.

Fig. 3. View of a portion of a frond that is attached to the shell of an *Endoceras proteiforme*.

Fig. 3 a. Enlargement of a portion to show the arrangement of the cells. Mr. E. Hurlburt's collection.

DENDROGRAPTUS TENUIRAMOSUS.

Page 21.

Fig. 4. A very perfect frond showing the flexuous stipe and slender branches.

DENDROGRAPTUS SIMPLEX.

Page 20.

Fig. 5. A portion of a frond showing the celluliferous side.

Fig. 6. The noncelluliferous side of a frond which differs somewhat in its mode of branching.

Fig. 5 a. Enlargement of a portion of a branch of fig 5.

Fig. 5 b. Still further enlargement of a cellule on 5 a to show its character and position on the branch.

ORTHOCERAS ONEIDAENSE

Page 22.

Fig. 7. Natural size and appearance of the individual described.

Fig. 7 a. Enlargement to show the cancellated surface.

MODIOLOPSIS CANCELLATA.

Page 22.

Fig. 8. View of a right valve, natural size.

Fig. 8 a. Enlargement of the surface. The concentric striæ are not as strongly indicated as they should be.

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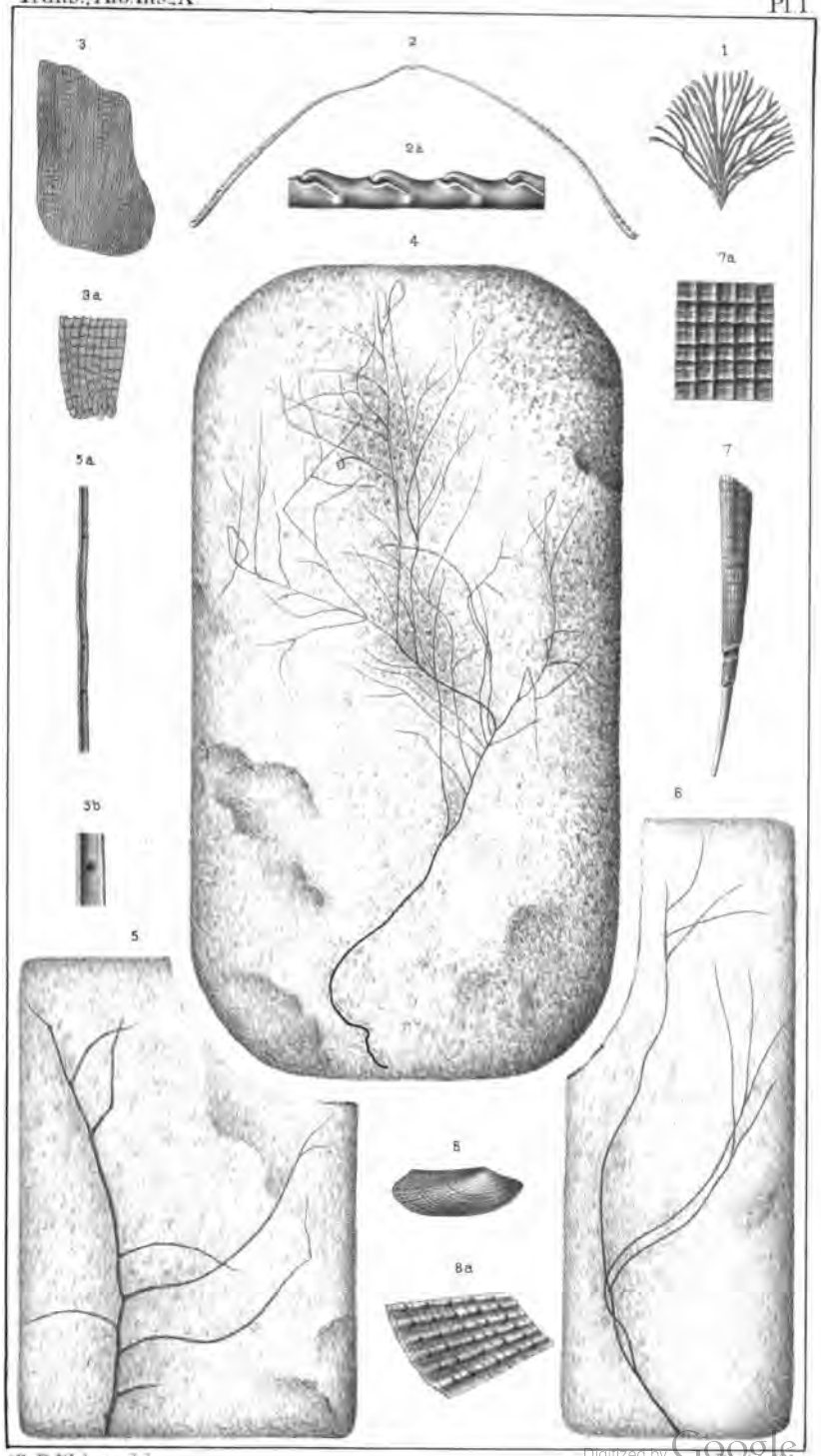

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EXPLANATION OF PLATE II.

TRIARTHRUS BECKI GREEN.

Page 23.

Fig. 1. Natural size and enlargement of an individual having one thoracic segment.

Fig. 1 a. A narrow and more elongate individual of the first known degree of development having one segment in the thorax.

Fig. 15. Natural size, and enlargement of 1 a, to fifteen diameters to show the character of the head and pygidium and their relative proportions and size.

Figs. 1–13. A series of individuals illustrating the gradual development of the head and throax on the addition of each thoracic segment The pygidium diminishing in size as compared with the other parts of the body. The numbers 1–13 also indicate the number of segments in the thorax of each individual to which they refer. All enlarged to three diameters.

Fig. 13. Enlargement to three diameters of an individual having fourteen thoracic segments.

Fig. 14. Fully developed individual of sixteen thoracic segments, natural size. All the larger specimens have been flattened by compression. The csnvexity in the figure is the same as in an individual of sixteen segments, 33mm in length.
The free cheeks are also pressed out so as to show their margins.

CYATHOPHYCUS RETICULATUS.

Page 18.

Fig. 16. A frond presenting the usual characters when flattened between the layers of shale.

Fig. 16 a. A small frond showing the true cup like form.

Fig. 16 b. A more elongate tubular frond with a somewhat contracted aperture.

Fig. 16 c. A fragment of a frond showing the thickened cell walls.

Fig. 16 d. Base of a frond flattened down upon the frond. The last is from Mr E. Hurlburt's collection.

CYATHOPHYCUS SUBSPHERICUS.

Page 19.

Fig. 17. A flattened frond showing the plain structure and the small opening at the summit. A portion of the margin is broken away.

DISCOPHYCUS TYPICALIS

Page 19.

Fig. 18. A small characteristic specimen. The margin is slightly corrugated and numerous individuals of *Orthis testudinaria* are attached to the surface.

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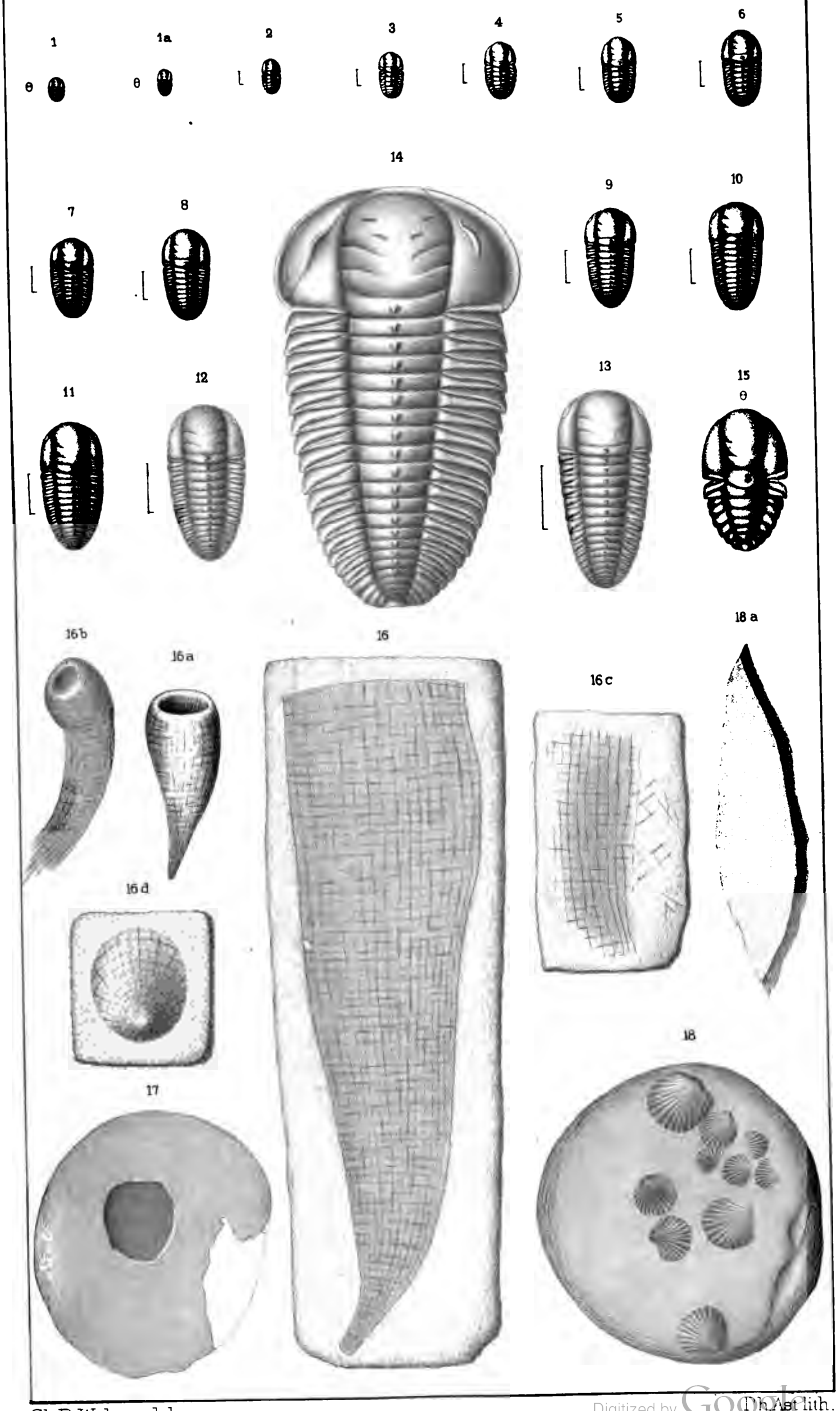

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FAC SIMILE

of the Initial T, engraved on

A NEW YORK MILITARY COMMISSION

from Gov. G. Clinton,

of June 25, 1778.

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FAC SIMILE
OF A NEW YORK REGIMENTAL FLAG
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FROM THE PAINTING IN ST PAUL'S CHAPEL
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SKETCH OF THE ARMS
AS RESTORED FOR THE ACTION OF THE
LEGISLATURE.

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THE ARMS OF THE STATE OF NEW YORK,

AS RE-ESTABLISHED BY CHAPTER 190 OF THE LAWS OF 1882,

AND REQUIRED TO BE USED ON THE SEALS OF ALL

THE PUBLIC OFFICES AT THE CAPITAL

FROM THIS DATE.

JOSEPH B. CARR,

Secretary of State.

ALBANY, *Jan. 1, 1883.*

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